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Original Articles.

INFLUENZA AMONG CHILDREN AS SEEN IN A HOSPITAL WARD.

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[From the Children's Medical Service, Massachusetts General Hospital.]

INCIDENCE AMONG CHILDREN.

THE influenza epidemic of 1889-1890 affected children as well as adults, but because it spared the breast-fed babies, some of the earlier writers thought all children were immune. The most susceptible were the children of school age and adolescence. These facts are borne out by European statistics, of which the following is an example[1]: The percentage of children in 47,000 cases treated by physicians in Bavaria in 1889-1890, were as follows:

AGE	
One year	1.5%
Two to five years	5.4%
Six to ten years	6.6%
Eleven to fifteen years	7.2%
Over fifteen years	79.3%

The incidence of influenza among children in the present epidemic can be known only when complete medical returns are made to the boards of health. One factor which undoubtedly reduced the incidence among children in the present epidemic was the prompt closing of schools. The action of the authorities in so doing cannot be too highly commended.

The symptoms and course of the disease in older children were similar to those of the adult. The younger children tended to have less typical symptoms, and during infancy the picture was at times so atypical that the diagnosis would not have been suspected were it not known that other members of the family were sick with the disease. Fortunately, with the exception of the new-born, and premature infant, the nursing infant rarely, if ever, contracts the disease.

The three types of disease spoken of in the earlier epidemics are the catarrhal, gastro-intestinal, and nervous types. As will be seen later, nearly all the cases in the present series fall into the catarrhal or pulmonary type, while only in rare instances are there gastro-intestinal complications, and in no instance symptoms referable to the central nervous system which could not be explained by fever. The gastro-intestinal symptoms appear to be more common in infancy than during childhood. This would agree with the experiences of the earlier epidemic.

The thirty-one cases in this series were studied in the Children's Ward of the Massachusetts

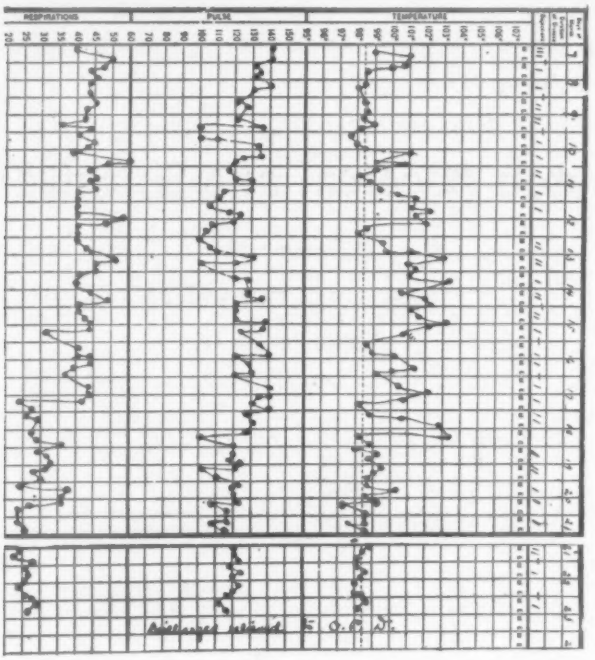

CHART 1.

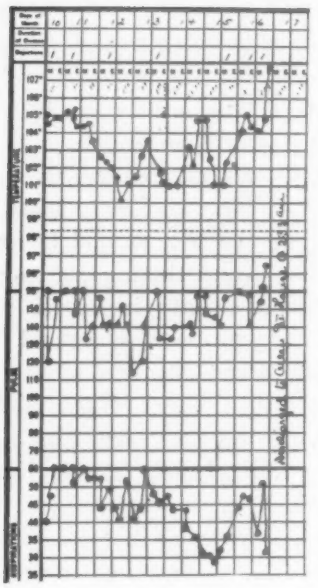

CHART 2.

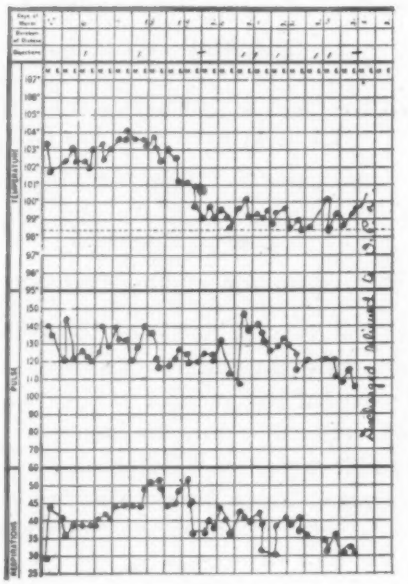

CHART 3.

General Hospital. The first case entered September 12th, five days after the entrance of adults to this and other hospitals. Ten of our cases were under two years of age, and none were breast-fed except an infant eleven days old. Ten were in the second and third year, and the rest ranged up to twelve years. The greatest number of admissions for any one day was four on October 7th. The majority of these cases, we found, had been sick from four days to one week before their admission to the Hospital, and, with a few exceptions, represented the severest form of the disease. This report, therefore, cannot be said to represent the epidemic as a whole, but merely the sickest type of hospital case.

In many instances the disease commenced with sneezing and profuse watery discharge from the nose. The infection then spread down the respiratory tract, and coughing became a constant and distressing symptom, being present in all cases. Contrary to the experience in

adults, there was no clinical evidence of sinus infection among the children, and otitis media was present only in four cases. There was only slight temporary reddening of the ear drum, which subsided in twenty-four to forty-eight hours without the formation of pus, in the remaining cases. In one instance the infection of the middle ear extended to the mastoid, but quieted down before operative interference was necessary. The incidence of sore throats was also less prevalent among the children than adults, and on inspection, the throat showed surprisingly little evidence of inflammation, being rarely more than slightly reddened. This may be due to the fact that the cases were not seen in the first days of the disease. There was definite enlargement of the glands of the neck in only two cases; in neither was operative interference necessary. The complaint of headache was markedly less in children, being present in only one-sixth of the cases. Fever was present in all cases, and at times was as high as 106F, (see chart). The height of the fever, however, did not necessarily give evidence of the severity of the disease. During the first weeks of the epidemic it was noticeable that children who were cyanotic early in the disease, in nearly all cases died. When cyanosis was absent the prognosis was usually favorable.

On physical examination there was a surprising uniformity of findings. The heart in all instances was normal to percussion and auscultation, except shortly before death. The liver and spleen were not enlarged in any instance, as a result of the disease. Conjunctivitis was present in a few instances during the catarrhal stage of the disease, but was not seen after four days, at which time it was not sufficiently pronounced or frequent enough to remind one of the prodromal symptoms of measles.

Involvement of the lung was present in all the cases studied, except one twelve year old girl, the remainder of the cases showing definite consolidation by auscultation and percussion and by x-ray. In one instance the writer was unable to determine any evidence whatsoever of consolidation after careful examination, but the x-ray showed a definite solid area in the left upper lobe. Even after comparing the x-ray findings with the child, it was impossible to demonstrate any clinical evidence of consolidation. This is not an isolated experience, but apparently was characteristic of the epidemic. Furthermore, all sick cases of influenza seen in the hospital showed other patches of consolidation than those that could be demonstrated clinically. It is our belief, therefore, that all severe cases in this epidemic were complicated with broncho-pneumonia whether clinical signs were present or not. The clinical signs are often those of a diffuse or capillary bronchitis, without consolidation. The x-ray in these instances showed a diffuse mottling of the lung. In twelve cases the left lower lobe was the first to become involved, this usually extending to other parts of the same side of the chest or to the right side; in eight cases, both bases showed signs of consolidation when the patient was first seen. It may be said, roughly, that the greater the extent of the solidification, the less likely was the patient to recover. There was rarely lobar pneumonia. Pathologically, there was always a broncho-pneumonia. In two of the cases, which came to necropsy, there was no evidence of emphysema of the lungs. Two cases of this series had empyaema; one was operated on successfully, and the other died.

The kidneys showed little or no evidence of trouble other than what might be expected with any severe infection. In six cases the urinary sediment showed a few leucocytes, but not enough to be considered of pathological importance, and in one they were in sufficient numbers to warrant the diagnosis of pyelitis. Two cases showed only microscopic blood, and twice there was a large trace of albumen. Considering the severity of the disease, the kidneys showed surprisingly little evidence of disease.

The examination of the blood confirms the findings of earlier observers. The white count, irrespective of prognosis, and complications, was low, in the majority of cases. It was 10,000 or under in five cases; between 10,000 and 15,000 in thirteen cases, and above 15,000 in five instances, the highest being 34,000. The differential count from the blood smear showed a polynuclear leucocytosis in all cases but one, an infant of five months which had only 40% polynuclear cells.

In a few instances, shortly before death, the deep sighing respiration made it seem probable that acidosis was present, but the carbon-dioxide tension of the alveolar air could not be determined because of the serious condition of the patient. Acetone was present in the urine in two cases. Usually during other acute respira-

tory infections in the winter, acetone is present in 90% of the cases.

PROGNOSIS.

In considering the prognosis, it must be remembered that only the sickest cases came to the hospital. The prognosis in mild, uncomplicated cases was favorable. Thirteen, or 42% of the cases in this series died. This was not far from the figures observed in adults in many hospitals. When cyanosis was present the prognosis was unfavorable, especially if present in the early stages of the disease. It is probable from the experience in this and previous epidemics that breast-fed infants do not often contract the disease.

AFTER-RESULTS.

An additional series of twenty-seven cases, which had been treated at home were brought to the Out-Patient Department for examination one to three weeks after they had recovered from the disease. They were examined with special reference to complications and after-results. Seventeen were perfectly well, one of them was well known to the clinic, being under treatment for acute endocarditis. So far as could be determined no damage had been done to the heart after recovering from one week's illness in bed. One child developed a systolic murmur without any evidence of endocarditis and in a third a quiescent endocarditis flared up during the disease. In four cases a cough persisted for three weeks without any physical signs. This apparently is characteristic of the experience in adults. There was evidence of trouble in the naso-pharynx and the adjacent organs following the influenza infection except in five children (tonsils 1, adenoids 1, otitis media 2, mastoid, which had been drained, 1). Up to date it has not been found that tuberculosis was the after-result of this disease, but it will be necessary to study a much larger group of children over a longer period of time, to determine this point. It has been said that influenza holds a place with measles and pertussis in predisposing a child to tuberculosis. The immediate after-results of influenza in this epidemic were similar to those of any acute respiratory infection and were not characteristic.

TREATMENT.

The treatment of the disease is symptomatic. Careful and individual nursing is the most important single element of treatment. Crowding should be avoided. Better results are obtained in the home with individual nursing, than in a hospital, no matter how good, where there is unavoidable crowding, and one nurse has to care for several patients. There should be plenty of fresh air. The children that were out on the covered porch of the hospital seemed to do better than those indoors. They should be given as much food as the digestion can stand, and plenty of liquid. This, however, will not be done, unless a liquid chart is kept. The minimum amount of liquid to be given is the amount which the child takes during health. With this fixed minimum, 50% more should be added, and the physician should insist that the child receive it as long as the stomach does not rebel. The liquid dilutes and carries away the toxines through the kidneys. During high fever much more food is being burnt up than in health, and since the first food component to be burned up is carbohydrate, plenty of carbohydrate should be given in the food to replace that which is burnt up in the body. If this is done there will always be enough sugar in the blood to prevent the formation of acetone bodies and acidosis. If sufficient liquid is given there will probably be no abdominal distention. Distention should be treated with carthartics, enemas and stupes. Stimulation may be given when indicated, but in my experience, it does not modify the eventual outcome. Normal salt solution given subcutaneously when the body is obviously not receiving enough fluid, however, often acts as a powerful stimulant, and is an exception to this rule. It may be given intravenously in older children, and into the lateral sinus in young infants. When either of these procedures is necessary, 5% pure glucose may be added to the normal salt solution, with excellent results. The glucose probably acts only as a food and not as a stimulant. Theoretically it is of the most value when the child has taken none or insufficient food for twenty-four to forty-eight hours.

REFERENCE.

[1] Pfaundler and Schlossmann: Dis. Children, English Edition, 451.

INFLUENZA AMONG CHILDREN AS SEEN IN PRIVATE PRACTICE.

By Arthur A. Howard, M.D., Boston.

In the influenza epidemic prevalent in Boston during September, October, and November, 1918, the clinical picture presented by the children seen in private practice differed materially and gave a far different impression from that obtained in the isolation wards at the hospital. Influenza infection among children seen at the hospital appeared much like the adult type of the disease and developed a high mortality. Children seen in private practice were, in general, much less ill, did not resemble as closely the adult type and the mortality rate was much more favorable.

It is the object of this paper based on the study of 70 consecutive cases to present the typical clinical picture and some of the chief features that characterized the average private case. The story and uniform picture presented, that varied only in degree, was as follows: The child was taken suddenly ill with a high fever—usually with initial headache and vomiting, moderate prostration and a hacking irritating cough. The first impression gained on looking at the child was that it seemed less ill than the temperature indicated. The distinctive clinical features were: The cheeks flushed a deeper more cyanotic red than the usual fever flush; there was also a greater or less degeree of cyanosis of lips and skin. The eyes appeared more red and irritated than with an ordinary cold or fever; the injection of the vessels of the cornea, simulating that seen in measles. The child was dull but restless, from simply tossing about to active delirium. The breathing was only moderately rapid and not labored even when considerable pneumonia was present. The temperature was usually high, most often 104 to 105, even in cases with but scanty physical findings. The throat was injected a dull red color but, as a rule, did not look as severe a sore throat as the temperature indicated. The mucous membranes of the throat were unusually clean as regards exudate or patches even in cases where the membranes were so engorged that coughing caused bleeding. The cervical glands were usually moderately enlarged. The dry hacking cough was a very noticeable feature of cases both with and without pneumonia complications. Acetone odor to the breath was noticeable in a high percentage of cases. The acetonuria did not, however, seem severe and added but slightly to the child's dullness and prostration. Other findings were conspicuous by their absence.

This description briefly indicates the picture presented in a great majority of cases. The unusual case, the child dangerously ill, had a pasty pale appearance even when the temperature was high. Or occasionally had a flushed appearance but the flush was a markedly deep red from cyanosis and the child was very dull, stuporous or delirious.

INSPECTION SINGULARLY EFFECTIVE AND CORRECT IN SIZING UP PHYSICAL CONDITION AND PROGNOSIS.

After seeing a few of these cases, one could not help but be impressed by the value and accuracy of his inspection in contrast to the results obtained from a careful physical examination. If, on inspection, the child did not appear ill, although the temperature might be 105 or more, physical examination not only failed to reveal any complicating pneumonia but almost invariably the child did not develop pneumonia later and would be much improved, with a marked drop in temperature, even to normal, in twenty-four to forty-eight hours; or, if pneumonia was present, but few patches appeared and quickly resolved. If, on the other hand the child looked ill, regardless of whether the temperature was 102 or 105, the child would invariably prove to have pneumonia or develop signs of pneumonia in a few hours. The practical importance of the inspection in both instances lay in the fact that it was more reliable than the results of careful physical examination and, if heeded, safeguarded errors in diagnosis and prognosis that would have occurred had only the results of auscultation and percussion been considered.

COMMON CLINICAL FEATURES.

1. Symptoms.

a. Headache was complained of even by the younger children. This seemed to be an almost constant source of real discomfort in every case old enough to express this symptom.

b. The eyes also, apparently, ached and caused considerable discomfort not only among those old enough to describe their feelings but also among the young children, as judged from their actions.

c. Cough was a most constant and irritating symptom in the majority of cases. It was of a dry, hacking character simulating a measles cough. The cough did not suggest pertussis except in cases having pertussis or having recently recovered from whooping cough.

d. Nosebleed and bleeding from the throat frequently occurred. The bleeding from the throat was limited to small amounts of bright blood expectorated on coughing or, in some cases where the membranes of the throat were engorged, forcible depressing of the tongue and the resulting spasmodic gagging caused slight bleeding. The nosebleeds, although fairly common occurrences in these cases of marked injection of the mucous membranes, were not usually severe and required no treatment.

e. Not a single child complained of earache. Only two cases, both of which were among those too young or too ill to mention earache, developed any ear complications. In both of these cases, it was a simple otitis media. There were no cases of mastoid or sinus involvement. Absence of middle ear complications was especially striking in view of the marked involvement by the infection of the upper respiratory tract.

f. Digestive disturbance though often present was not as a rule, severe. Vomiting was usually limited to once or twice. Where the vomiting was more persistent, treatment of the acidosis eliminated this trouble. Intestinal indigestion was more frequently met with in the younger children than in those who were older. As a rule this disturbance was no greater than would be expected with the temperature, and in no case, proved a very troublesome feature.

Pain in children old enough to localize their trouble was occasionally complained of in the muscles of the legs and arms. It was not, however, apparently, as severe as in adults. Delirium was present in the first 24 hours in a majority of cases averagely ill. This feature did not last as long and was not as severe or troublesome in children as in adults; this was especially true in young children. In very few cases was the delirium active enough to require sedatives or any treatment other than cool sponges.

A summary of the symptoms in the order of the frequency of occurrence follows:

TABLE I.

(Number of cases, 70.)

SYMPTOMS	PRESENT
Cough	70
Headache (34 too young to state; 2 no ache)	34
Acetone breath	55
Vomiting	41
Nosebleed	17
Diarrhea	14
Earache	2?

2. Physical Findings.

Cyanosis of the type described in the typical clinical picture was almost universally present to a greater or less degree.

Eyes showed injection of the mucous membranes of the lids and of the vessels of the cornea.

Throat in the majority of cases showed only slight redness and practically never any exudate or patches. Such cases having a higher temperature than would be expected from the appearance of the throat. In the more severe cases the mucous membranes of the nose and throat were markedly injected and were of a dark cyanotic appearance. Such cases often showed sufficient engorgement to cause bleeding on very slight provocation.

The Cervical Glands were moderately enlarged in nearly every case. Even in the severe cases of this series, however, there was not a single instance in which the glands became reddened or broke down.

Ears. Only two cases developed any ear complications. They were both simple otitis media and were very mild in character.

Mastoid and Sinuses. No evidence of mastoid or sinus involvement was found in any case.

Heart. There were no cases of pericarditis, endocarditis or valvular involvement. In cases in which pneumonia was severe and the child was markedly prostrated and toxic, there were evidences of dilatation of the heart but even these failed to display the typical signs of myocarditis.

Abdomen. The liver and spleen did not show any distinctive features. No cases developed peritonitis or abdominal complications. Distention was present in many cases, troublesome in a few, but was a no more marked feature than might be expected with the high fever and resulting digestive disturbance.

Kidneys. The examination of the urine was not carried out as a routine. In the cases examined, the findings were only such as might be expected on account of the fever and upset metabolism. No cases developed definite nephritis or pyelitis.

Central Nervous System. Although many cases were delirious and there was a suggestion of encephalitic irritation in a few, no cases developed an active encephalitis and there were no meningitis complications.

Lungs. Nearly every case that was at all severe in character showed either a marked bronchitis or a pneumonia. Bronchitis, more or less marked was present in all 45 cases not showing pneumonia; 25 of the 70 cases developed pneumonia. The type of the pneumonia was universally broncho-pneumonia.

The location of the lesions seemed to be nearly uniformly distributed between the two lungs with greater involvement of the middle and lower lobes. The pneumonias were characterized in general by scanty physical signs. The patches were usually small; individual areas, as a rule, cleared quickly. In cases where the disease was prolonged, this was due to continued development of new areas of consolidation. Most cases in which the physical findings justified a diagnosis of fairly extensive bronchitis, but did not justify a diagnosis of pneumonia, subsequently proved to be pneumonia. Usually such cases had only small patches of consolidation but few subsequent areas developed and the duration of the disease was short.

COMPLICATIONS.

The only common complication of the influenza infection, if so constant a physical finding can be called a complication and not a part of the disease, was the bronchitis and broncho-pneumonia. Acetonuria was the only other frequent complication and that, as already described, was usually mild in character.

The pneumonia was singularly free from complications. Of the 70 cases considered, there was not a single case of empyema and only one of unresolved pneumonia. This case, after one and a half months is now clearing up.

As might be expected, children having pertussis or being debilitated as the result of whooping cough ran a more difficult course than other children. The temperature might not run any higher but the children seemed more prone to develop repeated patches of broncho-pneumonia which resolved more slowly and prolonged the duration of the disease.

PROGNOSIS.

MORTALITY (PRIVATE PRACTICE.)

No. of Cases	No. of Deaths
70	1

In general the children seen in private practice were less ill as regards life than their temperature indicated. The broncho-pneumonia, having rapidly clearing areas and clearing up rather rapidly, ran a less protracted course and produced less loss of weight and caused less general debility than would be the case in the average broncho-pneumonia. For the same reasons, the mortality was favorable over ordinary broncho-pneumonia. In the severe and fatal cases, the clinical picture simulated the adult type of the disease much more closely, regardless of the age of the child. The fatal cases being pale rather than flushed even when the temperature was high. There was more cyanosis, so that the child had a pasty blue appearance, or if flushed, the flush was extremely dark red in color and the child was markedly prostrated.

Although some cases seemed more susceptible and less resistent from the start than others, in general, fatal results seemed more influenced by failure to get early or proper treatment. Cases which had been kept in rooms with windows closed and no attempt to keep bowels well open, were the ones seen with pale pasty appearance and fatal outcome. Such cases responded poorly to fresh air, purging, and all treatment, when such treatment was started at a late stage of the disease. This may well largely account for the different appearance and poor response to treatment in cases seen at hospitals and in consultation. My own consultation figures as contrasted with the results in private cases are suggestive in this connection, being as follows:
Number of consultation cases 21; deaths 5.
Number of private practice cases 70; deaths 1.

That the susceptibility, the duration of temperature, and the number of cases developing pneumonia was in inverse proportion to the age was the impression gained while in the midst of the work, before assembling the figures. The following tables seem to bear this out:

TABLE II. AGE *versus* SUSCEPTIBILITY.

Total cases, 70

AGE	NUMBER
Under one year	11
One to two years	12
Two to five years	23
Five years and over	24

The relatively fewer cases under one year and from one to two years is the more significant in view of the fact that from 75 to 80 per cent. of my usual practice is among children under two years of age.

TABLE III. AGE *versus* DURATION OF TEMPERATURE.

AGE	AV. DURATION OF TEMP.
Under one year	2.9 days
One to two years	3.9 days
Two to five years	3.3 days
Five years and over	4.9 days

TABLE IV. AGE *versus* PNEUMONIA.

AGE	NO. CASES	PNEUMONIA
Under one year	11	2
One to two years	12	4
Two to five years	23	4
Five years and over	24	15

TREATMENT.

The most essential and effective measures were:

1. *Elimination of Toxins.*

a. Fresh air—with or without pneumonia.

b. Free catharsis—two or three stools a day.

c. Pushing fluids—water, milk, gruel, orange juice.

2. *Early treatment of the throat and naso-pharynx.*

a. Potassium chlorate in large doses seemed unusually effective and prompt in quieting inflamed mucous membranes of the throat—definite results in 12 to 24 hours—large doses given.

Child of four or five seen in late afternoon given 20 to 25 grains in following 12 hours. Not particularly effective or necessary after using for two consecutive days. Discontinued after second day. Aspirin not as effective. Throat did not quiet as quickly. Temperature kept up for longer period—even with no pneumonia or other complications.

b. Gargle when old enough—not used much.

c. Argyrol (15%) to nose.

3. *Pushing Food.* After first 12 hours, when water only was urged. Milk, cereal, bread and broth given freely regardless of temperature. Small amounts at three to four hour intervals rather than large amounts at longer intervals.

4. *Reducing Temperature.* Depressants did not work well—seemed contra indicated. Cool sponges and cold air most effective in reducing temperature and in quieting restlessness and delirium.

5. *Quieting patient.* Sponge all that was usually used.

In extreme restlessness and in delirium used paregoric.

6. *Stimulants.* Not used—except in more severe cases—then used symptomatically.

Caffein seemed more helpful than strychine and was used frequently during first few days of illness in all cases more than moderately ill. Cases indicating stimulation most definitely were cases which responded poorly to all measures of treatment.

7. *Acidosis (acetone breath).* Soda Bicarb. was given in five to ten grain doses in teaspoon-amounts of water at two hour intervals until vomiting or marked acidosis symptoms disappeared.

8. Vaccines were not used extensively enough to warrant drawing conclusions as to their effectiveness either as treatment or prophylactically.

9. *Glucose solution* 5% in physiologically salt solution was used intravenously as a last resort measure in two cases. In one the results were very striking. The child, which was apparently dying, showed a tremendous reaction. The temperature, which was 104, rose to 108.2 in one hour, followed by a rapid drop to 97 in three hours. The child did not develop any new areas of consolidation and had an uneventful convalescence. In the other case life was apparently prolonged for forty-eight hours but with no marked reaction either in temperature or in favorable effect on the disease.

SUMMARY AND CONCLUSION.

1. The children infected with influenza were much less ill than adults.

2. The clinical picture of children seen in private practice differed from that of children in the hospitals in that the symptoms and physical findings in total were on the average, much less severe and the mortality lower.

3. Children ill with influenza infection presented a fairly definite and uniform picture. One of the chief characteristics of the disease was the frequency of a complicating bronchitis or broncho-pneumonia.

4. The most consistent symptoms were cough, headaches, and a mild acidosis.

5. The most consistent physical findings were high temperature, injected eyes, inflamed mucous membranes of the upper respiratory tract; bronchitis and broncho-pneumonia.

6. Children were susceptible to the infection in inverse proportion to their age. This fact seems borne out by the statistics in this series. Also, it was noticeable in the home that the order of developing the infection was parents (young adults), older children, younger children, and last the baby, even when the baby was nursed by an infected mother.

7. Inspection was particularly valuable over other methods of physical examination in determining diagnosis and prognosis.

8. Children having pertussis or but recently recovered seemed especially vulnerable, ran a severe course, were much longer ill and made a slower convalescence.

9. The most effective treatment consisted of fresh cold air, free catharsis, early treatment of throat, forced fluids, and supportive treatment in pushing soft solid foods.

10. Aside from the pneumonia and bronchitis the children were singularly free from complications.

11. The prognosis in these cases as to the severity and duration of the disease could be unusually correctly foretold at the first visit by inspection and general physical examination. The cases having broncho-pneumonia ran a more favorable course than would usually be the case in a similar number of average broncho-pneumonias. The mortality among the children when early treatment was obtained was not at all unfavorable.

12. The convalescence in the cases averagely ill was marked by a rapid recovery up to the point of being able to sit up and walk about the room; then a rather slow regaining of strength, the color and general appearance being usually better immediately after recovering than in the subsequent few days. After this period of slow recovery was passed the child returned to normal condition very satisfactorily.

13. One very definite clinical impression received was that the children developing influenza infection during the first days of the epidemic and while the spread of the disease was on the increase were much more acutely and suddenly ill than those developing the disease at the height or during the wane of the epidemic.

EPIDEMIC MENINGITIS SITUATION AT CAMP MacARTHUR: HOW DEALT WITH.*

By Leon S. Medalia, M.D., Boston,

Major, M. C., U. S. Army; Chief of Laboratory Service, Base Hospital, Camp MacArthur, Waco, Texas.

INTRODUCTION.

The winter of 1917-18 has been the first which has seen large numbers of men from various parts of the country congregated in the military camps. The epidemic diseases encountered in such camps, the methods used in overcoming them, especially when such methods were successful, are worth recording. This, I feel, is the case with epidemic meningitis at Camp MacArthur. This article is a description of the meningitis situation at this camp, methods of procedure in dealing with detection of carriers, and outcome. The word "situation" is used rather than "epidemic," because at no time has the disease assumed an epidemic form; at no time did we have a second case in any company or squadron, after once cultured and the carriers isolated; nor did we have any case develop amongst those that were detected as carriers. How much this is due to the methods used and how much was coincidence, no one, of course, would venture to say, but the fact was certainly a happy one

I. DETECTION OF CARRIERS.

The most important prophylactic measure in this disease, as is well known, is the detection, isolation and treatment of the meningitis carriers. Upon this single measure, if successfully carried out, will depend the possibility of nipping in the bud the ravages wrought by this disease, if at all allowed to become epidemic in form. All the conditions necessary for this disease to become epidemic and spread rapidly are not wanting in military camps, especially during the winter months. It is for that reason that prompt action must be followed out to detect the possible carriers in order to break the chain of the vicious circle established by the occurrence of a case of meningitis in a military camp. The probability that the disease develops from meningococci, appearing first in the naso-pharyngeal mucous membrane would, if detected before the disease established itself, save the development of many cases of actual meningitis.

* Read before the Medical Officers of Camp MacArthur, at a stated meeting, June 17, 1918.

This is another good reason for the prompt detection of carriers.

Method. Upon the occurrence of a case of meningitis, that is, as soon as the diagnosis was made, the whole company or squadron, consisting of about 200 individuals, was at once placed under quarantine, cultured, and the possible carriers isolated and treated.

The culture medium in use in the beginning was serum water glucose agar. Later 5% human blood in glucose agar. The petri plates were divided in two, at most, three, parts with a glass pencil. The "west tube" was found cumbersome. The straight wooden nasal swab was found most expedient and gave good results. It does away with the necessity of tongue depressors and the possibility of saliva admixture while withdrawing the swab.

A roster of the company or squadron was prepared in duplicate. The whole company was lined up according to roster and two swabbers set to work, one taking the company from 1 to 100, the other from 101 to the last, each having a clerk read off the name and number, the latter to correspond to the number on the plate. When swabbed the men were seated facing the light; the swab was passed through the anterior nares along the floor of the nose until the posterior wall was reached. The swab was then rotated, touching posterior pharyngeal wall and eustachian eminences, withdrawn carefully, inserted in the second nostril and the same procedure carried out. The mucus was then planted on the part of the plate to correspond with the number of the man; three streaks were made with the tip of the swab, radiating from the place where the mucus was first deposited. As a rule, there was not much mucus to interfere with the obtaining of individual well disseminated colonies. The plates were placed in closed buckets, kept warm by means of hot water bottles, while in transit to and from the laboratory. Upon reaching the laboratory they were immediately placed in the incubator.

Identification of the Organism. The method described by Flexner[1] was closely followed. The plates were incubated over night at 37°; at 10 A.M the next day they were removed and kept at room temperature and examined at 1 P.M. The suspicious looking colonies were smeared on slides and stained by Gram's method; and if found gram-negative were subcultured on slanted blood agar tubes or serum water glucose agar slants for further study and agglutination. Those persons whose culture showed gram-negative diplococci and colonies typical of meningococcus were considered probable carriers and at once isolated from the rest of the company, and spraying with dichloramin-T instituted.

Early in this week it was noted that if the plates that showed the gram-negative diplococci were left at room temperature over night and reëxamined the next day a number of them developed pigment, or became opaque and large, showing definite characteristics of micrococcus catarrhalis, flavus or other indefinite gram-negative organisms, which grow at room temperature. Thus keeping the plates for another 24 hours at room temperature has saved considerable time in attempts at agglutination.

The rule was that if the culture showed colonies that were fairly transparent, with edges that would blend with the culture medium, somewhat larger than pneumococcus, consisting of gram-negative diplococci, and not changing when kept at room temperature over night, the person from whom the culture came was considered a probable carrier and treated as such. Subcultures were made and agglutination proceeded with; if negative, the supposed carrier was at once released. But if the subculture failed and agglutination was not possible, he was kept until found free of gram-negative diplococci upon subsequent cultures.

Colony and staining characteristics, as well as morphology, were found to be the most important reliance. While isolation for agglutination was attempted in every case, it must be admitted that it was successful only in a small proportion of the cases. The chief difficulty was in obtaining a growth on the subcultures for the agglutination. Fermentation reaction has been resorted to as a last measure in some cases. The results certainly proved the advisability of our procedure. The fermentation reaction is worth resorting to and is very simple. The meningococcus, as is well known, ferments maltose and glucose, but not saccharose. The catarrhalis does not ferment glucose; and other gram-negative organisms ferment saccharose. (Dextrose, maltose and saccharose bouillon put up in Durham's fermentation tubes, to which is added azolitmin solution as an indicator, also the addition of serum water in proportion of 1-5, is to be recommended for the purpose.)

Culture Media. As already stated, the cul-

[1] Jour. Am. Med. Assn., Sept. 1, 1917.

ture medium used in the beginning was 2% agar from beef infusion broth, 1% Dextrose, to which has been added serum water in proportion of 1 to 5. (Human serum was obtained in a sterile way and mixed 1 part to sterile water 3 parts), reaction, 0.4 to phenolthalein; this gave a perfectly clear transparent medium and grew the meningococcus readily. Later, however, this was replaced by 5% human blood added to the same glucose agar, which is being used to date.

The glucose agar is kept in 1,000 c.c. flasks in amounts of 500 c.c. in each flask; eight such flasks are kept on hand in the refrigerator. When necessity arises, four of these flasks are melted, the temperature brought down to 45° C. 25 c.c. of blood is obtained from the arm vein in a sterile way and immediately added to the 500 c.c of melted agar and at once plated out. If the work is done in a room with closed windows and the plates protected from dust at the time of plating, the chance of contamination is reduced to a minimum.* From 35 to 40 plates are obtained from each of the 500 c.c. of blood, making 140 or more plates from the four flasks, each divided by two, giving more than enough for the culturing of a whole company. All this can be done within two hours, and the culturing of a whole company as outlined above takes from 1½ to 2 hours. The other four flasks are used to reculture the whole company on the third day, while more media are made up and a third culture is taken again on the third day.

The advantage of this procedure is obvious. Thus within four hours of the appearance of a case of meningitis we had the whole of the company under quarantine and cultured. The second and third culture, I believe, is necessary. Our findings have demonstrated the advisability of this procedure; the chance of error is minimized and the skipping or overlooking an active carrier for various reasons is thus done away with. The use of fresh blood instead of defibrinated or laked blood or the serum water agar is to be recommended, especially where one is working with an enlisted personnel who are not trained technicians, the less one has to handle a culture medium that cannot be autoclaved before use, the better off one is.

* A long piece of beaver board or an ordinary board 18 cm. wide, is set up on two test tube racks on the laboratory bench, the whole covered on all sides with a cotton sheet. The petri plates are set up under the board and are thus completely enclosed from all sides. The sheet is raised slightly in front while the medium is being plated. Endo plates have been prepared in this way in large numbers and with very little contamination.

The straight blood agar plates have also served another purpose, and that was the detection of hemolytic streptococcus. This, I feel, is as important as the detection of meningococcus carriers because of the streptococcus broncho-pneumonia, against which we have practically no remedy other than the prevention.

NUMBER CULTURED AND PERCENTAGE OF CARRIERS FOUND.

This report is based upon a study of 6,926 cultures, on a total number of 2,568 individuals. Out of this number there were 56 positive carriers and 2,513 negatives. This gives a percentage of 2.25% positive carriers. This low percentage of positive carriers may be accounted for partly by the fact that most of these individuals were really not "close contacts." The intimate association between men living in tents, most of the time in the open, where the weather is fairly good, is not marked. The wards that were cultured where the patient was from a few hours to a few days keeping to his bed should also be considered not "close contacts." The most important factor, however, in the low percentage of carriers is the good weather conditions. From tables in my possession of weather conditions of January and February (U. S. Department of Agriculture, Weather Bureau, Office of Coöperative Observer) I find there were three rainy days in January (January 11, three inches of snow; 14th and 22nd, ½ inch of snow) and one rainy day in February (February 17th). The temperature was also not very low. There were only three days in January in which the mean temperature ran below 30 degrees, and only one day in February.

Table I. gives a detailed account of the organizations cultured, number and percentage of carriers found and the total number of individuals cultured. Reference to that table will give one at a glance a clear idea of this part of the work.

The consideration of some of the groups individually is here given in order to bring out some points that cannot be brought out in the table:

GROUP 1. The reason for culturing the first organization, on December 17, 1917, for meningococcus carriers, was because a member of that organization when on a furlough was reported by wire to have died of epidemic meningitis at Cook County Hospital, Chicago. He left on

Wednesday feeling well and died on Saturday soon after his arrival in Chicago. His company was at once placed under quarantine and cultured. Out of 221 men only one positive carrier was isolated. This company was cultred three times,—December 17, 20 and 24, 1917. No other case developed in this company. It was felt at the time, that the case which died had contracted the infection on the train or just before leaving, rather than having contracted the infection while in camp. Certainly the finding of only one carrier and no other case developing while that case died within 72 hours is very suggestive. Thus, in this company of 221 men, probably not "close contacts," only one carrier, or 0.45%, was found.

GROUP 2. The second group was cultured for the first time on January 17, 1918, consisting of 199 men, in which a case of meningitis occurred,—the first case of meningitis in camp This company yielded five carriers; one on the first culture, three on the second, and one on the third. One streptococcus hemolyticus carrier was also detected.

Thus, this group of "moderately close contacts" yielded 2.5% positives. The necessity of culturing three times instead of once is fairly well illustrated in this company, where three positives were detected on the second culture and one on the third. Other similar findings have occurred and will be referred to later.

GROUP 9. This group was that of a squadron 198 strong. All were cultured three times (January 29, February 5 and 9, 1918), and all were found negative. The case of meningitis from this group, fairly fulminating, was admitted on January 28 and died on February 3, 1918. The question of positive carrier findings being in inverse relation to the severity of the case is suggested by this group and by group 3.

GROUP 10. This group consisted of a squadron 191 strong. The first culture yielded seven positives (February 3, 1918); the second (February 5, 1918), one positive; and the third, two positive carriers; thus making a percentage of 5.3—the highest percentage of positive carriers in all the groups.

This relatively high percentage, I believe, may be explained by the fact that one case from this squadron was admitted to the hospital on January 21, 1918, with indefinite symptoms until February 2, a lumbar puncture was done and the diagnosis of meningitis established. Meanwhile, on January 29, 1918, another case of meningitis developed in the same squadron (before the first case was diagnosed), at which time the squadron was at once quarantined and carriers isolated. No second case appeared after that. This incident strongly suggests the value of early diagnosis by lumbar puncture.

GROUP 11. This group is a squadron of 191 strong, cultured for the first time February 7, 1918, when two positives were found; the second time (February 10, 1918), four positives were detected; and the third time (February 13, 1918), there were two positives. The meningitis case of this group was brought to the base hospital in a comatous condition; 30 c.c. of spinal fluid was withdrawn and serum administered. He made an uneventful recovery. This group and the preceding one, as well as group 13, to follow, show the necessity of three successive cultures in each group. The percentage of positive carriers in this group is 4.2.

GROUP 18. This is a squadron, 153 strong, in which a case of meningitis occurred and was cultured for the first time May 18, 1918. At that time only the tent-mates, five in number, were cultured, with negative findings. These five men were cultured for the second time on May 20, 1918, and were again found negative. On the same day the rest of the squadron, 148 in number, were cultured and one carrier detected. The meningitis case remained with his company for four days before he was sent to the hospital. The low percentage of positive carriers (.65%) found under these circumstances can be explained only, I believe, by the warm weather, open tents, and outdoor life.

The squadron was cultured according to a pamphlet* received from the Surgeon General's office, which reads:—

"XII. INDICATIONS FOR CULTURING. On the appearance of a case of cerebrospinal fever, all contacts should be cultured for the detection of carriers as soon as possible. By contacts is meant those closely associated with the patient —that is, all those in the same tent or squad room with him, as well as his close associates at mess or elsewhere.

"Experience has shown the inadvisability of attempting to culture larger groups than these.

"In military service, those who give positive cultures should be held in the detention camp

* Standard Technic of Meningococcus Carrier Detection. Adopted by the Medical Department of the United States Army and Navy and the United States Public Health Service.

until they have had three successive negative cultures at five-day intervals. If the second case appears in the same company within a week of the first case, the whole organization should be swabbed."

In this particular group it meant to run chances with the whole squadron, which was under orders to leave, to be kept another week should another case have developed; while it was just as easy for us to culture the whole squadron as it was the tent-mates only. The isolation of the positive carrier found in this squadron at large minimized that chance.

I feel that our experience here in camp fairly warrants the statement that the whole company or squadron messing together should be considered "contacts" and all cultured twice or three times if possible. All this can be done within one week and the squadron released, while the carriers are isolated for treatment and observation.

DURATION OF THE CARRIER STAGE.

It is interesting to note the length of time that the carriers persisted in having meningococci in the nasopharynx. Out of a total of 56 isolated, 24 were treated in the hospital, where records have been kept. As will be seen in table 2, out of the 24 carriers treated in the hospital, the treatment with Dakin's solution and dichloramine-T. has been recorded in 10 cases. One of the remaining cases is recorded as having been treated with Dakin's solution alone. Although the treatment was not recorded in the other thirteen, from personal information, however, by the head nurse of the ward where the carriers were kept, it appears that almost all the others had treatment in some form—either Dakin's solution alone or combined with dichloramine-T.

Out of the 24 carriers three were discharged in five days, nine in six days, three in seven days; one in nine days, two in ten days, five in eleven days, one in twelve days. Thus an average stay in the hospital of seven days, with a minimum of five days and a maximum of twelve. Here, too, I believe, the warm weather as well as the treatment had something to do with the rapid clearing up of the carriers. *We had no chronic carriers.*

Two nurses and one physician taking care of the meningitis cases were cultured and found positive to meningococcus. All three, however, were found negative at the end of five to seven days. None of the carriers developed meningitis, nor, as already stated, has there developed in any organization a second case once the organization was cultured and the carriers isolated.

II. MENINGITIS CASES.

There were to date in this camp 13 cases of epidemic meningitis. Eleven of these recovered and two died—making a total of 82 per cent. recoveries.

These cases were followed clinically by the ward surgeons under the direction of the chief of the medical service. The diagnosis was made by laboratory findings, the meningococcus being demonstrated in the spinal fluid in each case except the last one (Case 13 on the chart). In this last case a most careful bacteriological examination of turbid spinal fluid of three successive days found all negative bacteriologically. Blood cultures were found sterile and cultures from posterior nares were also found negative to meningococcus. Response of the patient to the antimeningococcus serum—his symptoms and spinal fluid clearing up within four days—was accepted as evidence of its having been an epidemic meningitis case.

Agglutinations were carried out on the therapeutic sera on hand at the beginning in order to establish which of the sera was best to be used. We had New York Board of Health serum and that of a commercial house. The meningococcus obtained from the spinal fluid of the first case of meningitis was used in the test. It was found that while the New York Board of Health serum completely agglutinated in dilutions of 1 to 2,000, the commercial serum only partly agglutinated in dilutions of 1 to 50 and none in dilutions of 1 to 100. Naturally the New York Board of Health serum was recommended and used in all cases. I well recollect the ward surgeon (Lieut. Preston) complaining of the lack of clinical response when he used the commercial serum while we ran out of the New York Board of Health serum for a short time. We felt that the clinical findings corroborated the agglutination reaction. I feel, that our low mortality (18%) is in a great measure due to the use of a therapeutic serum demonstrated by laboratory methods to be effective against the particular type of meningococcus we had to deal with.

The data here given on the thirteen cases were obtained entirely from a critical analysis of the clinical records. All this data will be

found tabulated in detail in Table III. It is of interest to note that eleven of the thirteen cases occurred within twenty-five days (January 16 to February 10), which were the coldest days of the winter. Four of these eleven cases came to the hospital in one day, each from a different squadron. The twelfth case appeared on March 30, about seven weeks after the last case; and case thirteen appeared in about seven weeks after that. The first eleven cases would suggest that the disease had started to assume an epidemic form and that the measures taken for the isolation of the carriers had probably considerable to do in checking it. The last two cases are apparently sporadic in nature.

Symptoms on Admission. The symptoms on admission are worth calling attention to. Nine had headache and stiffness or pain in neck muscles. Four were comatose on admission with stiffness of neck or positive Kernig's.

I wish to emphasize here that while it is fairly easy to make a diagnosis when the patient shows definite symptoms of meningitis that are severe enough to leave no doubt in one's mind, it is of extreme importance, however, to make a diagnosis early in those cases that present indefinite or rather mild symptoms, if the spread of the disease is to be avoided. I believe that if attention be paid to the following symptoms: Headache, pain or stiffness of the neck muscles with a positive Kernig's, and when in doubt a culture for meningococcus be made from the posterior nares, and finally a lumbar puncture done, the diagnosis could be settled without difficulty. The lumbar puncture, if properly performed, does not jeopardize the patient in the least and is the best means of definitely establishing the diagnosis.

Prognosis. There were four cases admitted to the hospital in a comatose condition and recovered, while the two that died came in with symptoms not so grave. The onset of the disease—at least under serum treatment, as far as could be judged from this small series of cases—is no criterion as to the outcome of the case. This fact has been referred to by Flexner[1] and others.

The average length of time that those of the patients who recovered showed symptoms of meningitis after the serum treatment was begun is 8.6 days, the maximum being 14 and the minimum four days.

The average length of time that the recovered cases remained in the hospital for meningitis was 45 days, with a maximum of 110 days and a minimum of 23. The case that remained in the hospital for 110 days is the one that had a relapse 31 days after his first attack and during convalescence.

The average number of doses of antimeningococcus serum administered was eight, with a maximum of seventeen and a minimum of two.

Three of the cases received the first dose of serum on the first day of the disease; four on the second, two on the third, one on the fourth, one on the fifth, one on the sixth, and one on the thirteenth day.

There does not seem to be, in this series, any relation between the day in the disease the serum was begun and the mortality. In fact, in the two cases that died the serum treatment was begun on the second day in each.

COMPLICATIONS AND SEQUELAE.

An analysis of the records show the following complications to have occurred among the thirteen cases:

Ear. One case that showed marked deafness on the next day after being admitted, grew steadily worse and died in 18 days. The second case had a transient pain which yielded to treatment. Ear complications, 18 per cent.

Eye. One case had double vision and paralysis of the right rectus muscle, and another a mild conjunctivitis; both recovered. A third case was left with blindness of the right eye, diagnosed by the eye specialist as amaurosis, either of nerve or brain origin from behind the retina. Eye complications, 23 per cent.

Arthritis. None of the cases were recorded as having had a true arthritis.

Mental. One case developed a psychosis diagnosed as dementia precox, and is still in the hospital. He is the only case that developed a psychosis—making 9 per cent.

Orchitis. There were two cases with orchitis and both recovered (18%).

Serum Disease. There were four cases that developed serum disease. In two, on the tenth day following the administration of the first dose of serum, one on the fifteenth day and one on the seventh day after the first serum treatment for his relapse—this last case had no serum sickness while being treated for the first attack.

Five of the thirteen cases showed no complications.

In the eleven cases that recovered, five had no complications and no sequelae. In four of the remaining six cases the complications were of a transient nature and they made a complete recovery; while of the other two, one is still in the hospital with a psychosis and the other was discharged with blindness of one eye. The other eye has $^{20}/_{70}$ vision.

Relapse. Only one case had a relapse of the meningitis while convalescing in the hospital—thirty-one days after the first attack, but finally made a good recovery.

Mortality. The mortality of this series of 13 cases is: (13 cases, 2 deaths)=18 per cent.

The mortality of this disease as given by Flexner[1] in epidemics of this disease in various parts of the world ranged between 42% and 90% in those cases that were not treated with serum, and from 25% to 30% in those cases that were treated with serum. Our mortality of 18% is certainly a very satisfactory one.

SUMMARY.

It may be well to bring together here briefly all the facts that were brought out in this paper.

The total number of cultures studied was 6,926 on a total number of 2,568 individuals—made up of 18 groups (9 squadrons, 3 companies, 5 wards, and one group composed of guards and prison mates). The number of positive carriers found was 56, making 2.25% of the total cultured. The highest percentage in any group was 5.3%. None of the groups could be called "close contacts," because of the open-air life which obtained in the squadrons; and in the wards the patients were kept in bed. The average length of time in 24 of the 56 carriers, where records were kept, that the meningococcus persisted was seven days—a maximum of twelve and a minimum of five days. Practically all the 24 carriers had some treatment while they remained in the hospital. We had *no chronic carriers.* Whether the treatment had anything to do with the way the carriers cleared up is hard to tell; the treatment is simple and worth doing. The fact that at no time did we have a second case develop in any of the groups that were once cultured and the carriers isolated does, I believe, demonstrate the value of the method of procedure we have carried out in this camp.

There were 13 epidemic meningitis cases in this camp; eleven occurred within 25 days (January 16 to February 10), which were the coldest days of the winter. The last two cases could be considered sporadic in nature. Four of the eleven occurred in one day (January 28). The cold weather apparently causes a more intimate association of the men and direct transmission from carrier to susceptible individuals is here suggested.

Lumbar puncture has been the final and definite means of diagnosis in this series, and it cannot be emphasized too strongly that, in cases with symptoms at all pointing to meningitis, more especially when other cases of meningitis have occurred, lumbar puncture should be resorted to and done early. It should be done not merely from the standpoint of the patient and diagnosis, but for the sake of the many as a public health measure.

The average length of time that the patient actually showed symptoms of meningitis after serum treatment was instituted was eight days. A maximum of fourteen and a minimum of four days.

The average number of doses of serum given was eight—a maximum of seventeen and a minimum of two.

The sequelae of the cases that recovered were: One is left with loss of sight in one eye, and another with a psychosis. Five had no complications at all and the complications in the others were fairly transient in nature. (The four with the serum disease and the two with orchitis recovered.)

CONCLUSIONS.

The only conclusions that may be drawn from the foregoing are:

1. The whole company or squadron who mess together should be considered "contacts" and cultured for carriers upon the appearance of a case of meningitis.

2. The culturing of a whole company for three successive times at intervals of two or three days will minimize the possibility of overlooking any positive carriers.

3. Five per cent. blood glucose agar plates is the easiest of access and has given the best results. It also makes it possible to identify hemolytic streptococcus carriers.

4. The serum treatment seemed to have reduced the mortality of this disease in this

camp to a minimum (18%). The therapeutic value of the serum to be used may be determined by agglutination tests, using the particular organisms isolated from the cases as they appear.

In concluding, I wish to thank Lieutenant-Colonel S. W. French, the commanding officer of the base hospital, for his hearty coöperation in carrying on this work. I also wish to express my appreciation to Lieutenants J. H. Murphy and O. C. Hirsch, who have done a considerable part of the laboratory work connected with this study.

TABLE I. "CONTACTS" CULTURED.

No. of Group	Organization	Date	No. of Culture	Negative	Positive	Total Cultures	Total No. of Individuals	Per Cent. Positive Carriers	Remarks
1	Co. A, 126 Inf.	12-17-17	1st	186		186	186	.45%	Not "Close Contacts." Meningitis case died while on furlough upon arrival in Chicago.
		12-18-17	1st	35	1	36	36		
		12-20-17	2nd	207		207			
		12-24-17	3rd	217		217			
2	Sqd. 30, A. S. S. C.								First meningitis case in camp. "Moderately Close Contacts." (1 positive Streptococcus Hemolytic carrier also found).
		1-17-18	1st	198	1	199	199	2.5%	
		1-19-18	2nd	188	3	191			
		1-22-18	3rd	190	1	191			
3	Sqd. 15, A. S. S. C.	1-21-18	1st	190		190	211		Difficult to explain absence of carriers. See text.
		1-25-18	2nd	211		211			
4	Ward 23, B. H.	1-22-18	1st	53		53	56		Meningitis case developed in ward following measles. No carriers.
		1-23-18	2nd	56		56			
5	Sqd. 43, A. S. S. C.	1-22-18	1st	184	5	189	191	3.13%	Not "Close Contacts." Meningitis case developed after 10 days in hospital, following measles.
		1-24-18	2nd	191		191			
		1-28-18	3rd	185	1	186			
6	Ward 20, B. H.	1-28-18	1st	43		43	43		A ward of not "Close Contacts." No carriers.
		1-30-18	2nd	43		43			
7	Co. L, 128 Inf.	2-2-18	1st	191	1	192	196	1.5%	Not "Close Contacts." Case fairly fulminating.
		2-3-18	2nd	189	2	191			
		2-5-18	3rd	196		196			
8	Sqd. 5 & 375, A.S.S.C.	1-31-18	1st	187	3	190	197	1.5%	Case comatose when admitted. Probably not "Close Contacts." (1 Positive Streptococcus Hemolyticus).
		2-4-18	2nd	197		197			
		2-6-18	3rd	195		195			
9	Sqd. 61, Rct. A.S.S.C.	1-29-18	1st	198		198	198		Fulminating type of Meningitis. No positive carriers. Inverse relation of severity of disease to percentage of positive carriers suggested.
		2-5-18	2nd	198		198			
		2-9-18	3rd	197		197			
10	Sqd. 28, Rct. A.S.S.C.	2-3-18	1st	182	7	189	191	5.3%	1st meningitis case in group not diagnosed until 3 days after 2nd case occurred. (2 Positive Streptococcus Hemolyticus).
		2-5-18	2nd	184	1	185			
		2-11-18	3rd	189	2	191			
11	Sqd. 56, Rct. A.S.S.C.	2-7-18	1st	189	2	191	191	4.2%	Case comatose when admitted. Necessity for 3 cultures shown. See text.
		2-10-18	2nd	186	4	190			
		2-13-18	3rd	185	2	187			
12	Grd. & Pr. 324 Rmt.	2-12-18	1st	22	1	23	23	4%	Supposed to be "Close Contacts." Guard and Prison inmates.
		2-14-18	2nd	23		23			
		2-16-18	3rd	21		21			

No. of Group	Organization	Date	No. of Culture	Negative	Positive	Total Cultures	Total No. of Individuals	Per Cent. Positive Carriers	Remarks
13	Sqd. 19&375 A.S.S.C.	2-9-18	1st	189	4	193	193	5%	Meningitis case mild. Per cent of Positive Carriers relatively high. See Text.
		2-12-18	2nd	188	3	191			
		2-14-18	3rd	185	3	188			
14	Ward 20, B. H.	2-3-18	1st	28		28	29	3.4%	Patient in bed 10 days. Per cent. of positives low. (1 Strep. Hem.) See 15.
		2-5-18	2nd	29		29			
		2-6-18	3rd	28	1	29			
15	Ward 6, B. H.	2-4-18	1st	44		44	44		Case in bed 5 days. No spread of infection when in bed is suggested.
		2-6-18	2nd	41		41			
		2-8-18	3rd	34		34			
16	Ward 18, B. H.	2-6-18	1st	35		35	35	2.8%	Case in ward few hours. (1 Strepto. Hemolyt. Posit.)
		2-7-18	2nd	34	1	35			
17	Hdq. Co. 21, F. A.	4-1-18	1st	191	5	196	196	3%	Case mild, 4 days in Co. before sent to hospital. See remarks on group 18.
		4-3-18	2nd	191	1	192			
		4-5-18	3rd	191		191			
18	Sqd. 616, A. S. S. C.	5-18-18	1st	5		5	153	.65%	Mild case. Here warm weather may explain low positive per cent. See text.
		5-20-18	2nd	5		5			
		5-20-18	1st	147	1	148			
	Total			6870	56	6926	2568	Average 2.25%	

TABLE II. MENINGOCOCCUS CARRIERS.

Case No.	Reg. No.	Co. or Sqd.	Organization	Date of Admission	Days in Hospital	Treatment
1	7304	30	A. S. S. C.	1-18-18	10	Dakin's Solution and Dichloramine T. Oily Spray.
2	7564	30	A. S. S. C.	1-22-18	6	Dakin's Solution and Dichloramine T. Oily Spray.
3	7563	30	A. S. S. C.	1-22-18	6	Dakin's Solution and Dichloramine T. Oily Spray.
4	7562	30	A. S. S. C.	1-22-18	6	Dakin's Solution and Dichloramine T. Oily Spray.
5	7672	30	A. S. S. C.	1-22-18	5	Dakin's Solution and Dichloramine T. Oily Spray.
6	7891	43	A. S. S. C.	1-27-18	7	Dakin's Solution and Dichloramine T. Oily Spray.
7	7892	43	A. S. S. C.	1-27-18	12	Dakin's Solution and Dichloramine T. Oily Spray.
8	7888	43	A. S. S. C.	1-27-18	6	Dakin's Solution and Dichloramine T. Oily Spray.
9	7889	43	A. S. S. C.	1-27-18	6	Dakin's Solution and Dichloramine T. Oily Spray.
10	7890	43	A. S. S. C.	1-27-18	6	No Record of Treatment.
11	8081	43	A. S. S. C.	1-30-18	8	No Record of Treatment.
12	8292	L	128 Inf.	2-3-18	6	No Record of Treatment.
13	8333	L	128 Inf.	2-4-18	5	No Record of Treatment.
14	8334	L	128 Inf.	2-4-18	5	No Record of Treatment.
15	8462	B. H.	Med. Dept.	2-7-18	9	Dakin's Solution and Dichloramine T. Oily Spray.
16	8727	324	Rmt. Q.M.C.	2-13-18	8	Dakin's Solution only.
17	8762	56	A. S. S. C.	2-14-18	7	No Record of Treatment.
18	10822	Hdq.	21 F. A.	4-4-18	10	No Record of Treatment.
19	10851	Hdq.	21 F. A.	4-5-18	9	No Record of Treatment.
20	10760	Hdq.	21 F. A.	4-3-18	11	No Record of Treatment.
21	10758	Hdq.	21 F. A.	4-3-18	11	No Record of Treatment.
22	10759	Hdq.	21 F. A.	4-3-18	11	No Record of Treatment.
23	10756	Hdq.	21 F. A.	4-3-18	11	No Record of Treatment.
24	10757	Hdq.	21 F. A.	4-3-18	11	No Record of Treatment.

TABLE III. MENINGITIS CASES.

Case No.	Reg. No.	Date of Admission	Previous Illness	Meningococcus in Spinal Fluid	Symptoms: On admission	Cont'd for days	Total Doses Serum	Day in Disease 1st Serum Given	Relapse	Days in Hosp. for Meningitis
1	7112	1-16-18	Measles	Positive	Comatose, stiff neck, Kernigs positive	8	10	1st	No	48
2	6774	1-20-18	Diphtheria Measles	Positive	Headache, stiff neck, Kernigs positive	5	6	1st	No	34
3	7310	1-18-18	"Negative"	Positive	Severe headache, pain in neck	18	11	2nd	No	18
4	7511	1-21-18	Measles Malaria	Positive	Pain in head, vomiting (Fainted at mess)	10	8	13th	No	45
5	7948	1-28-18	Diphtheria	Positive	Comatose 24 hours, delirious 48 hours	14	17	2nd	No	25
6	7959	1-28-18	Mumps Scarlet fever Measles	Positive	Comatose, Kernigs positive, Brudzinskys positive	10	14	2nd	No	37
7	7980	1-28-18	Usual diseases of child.	Positive	Headache, chill, slight rigidity of neck, Kernigs positive	4	4	6th	No	33
8	7921	1-28-18	Measles Jaundice	Positive	Violent chill day before, pain in neck, Kernigs positive	6	11	2nd	No	6
9	8150	1-31-18	Measles	Positive	Severe headache two days before admission, muscles sore	10	11	3rd	No	34
10	8360	2-5-18	Usual diseases of child.	Positive	Comatose, Kernigs positive	6	8	1st	No	48
11	8567	2-10-18	Measles Pneumonia	Positive Relapse (3-13) Positive	Headache, pain over body (3 days before admission). Relapse of meningitis symptoms 3-13-18	4 4	6 4	3rd	Yes on 31st day	110
12	10581	3-30-18	Usual diseases of child.	Positive	Headache, occipital; stiff neck; vomiting; Kernigs positive (for last 3 days)	5	2	4th	No	62
13	12485	5-16-18	Measles Mumps Smallpox	40 cc. very turbid, negative to bacteria	Headache, stiff neck, Kernigs positive (Started 4 days prior to admission)	7	2	5th	No	23

TABLE III. MENINGITIS CASES (*concluded*).

Case No.	Complications and Sequelae						Results	Remarks
	Ear	Eye	Arthritis	Mental	Orchitis	Serum Disease		
1	None	Double vision	None	None	Bilateral	Present 10 days of 1st serum	Good recovery	First case in camp. Whole squadron cultured. Five carriers isolated. No other case in same squadron.
2	None	None	None	None	None	None	Good recovery	Admitted with measles. Five days after eruption cleared, meningitis developed. No other case occurred in the ward.
3	Marked deafness, 1-19-18	None	None	None	None	None	Died (Grew worse steadily)	His lack of response to anti-meningococcus serum and deafness suggested complicating pneumo infection. Five doses of anti-pneumo. serum given. Autopsy disproved latter.
4	None	None	None	None	None	None	Good recovery following serum given	In hospital for 10 days with indefinite symptoms when lumbar puncture was done and diagnosis established.
5	None	None	None	Psychosis	Yes, (rt.)	None	Meningitis recovered; psychosis unimproved	Psychosis (dem. precox) set in March 16, 1918. This case is still in the hospital for the psychosis.
6	None	None	None	None	None	None	Good recovery	Complained of severe headache before he became comatose and was sent to hospital. Course uneventful.
7	None	None	None	None	None	Present on 10th day	Good recovery	Diagnosis made in this case five days after admission, by lumbar puncture.
8	None	Blurred vision	None	None	None	None	Died	Fulminating type. Thought to have pneumonia on account of chill and temperature, but lumbar puncture cleared up diagnosis.
9	None	Rt. eye blind, lt. eye 20/70	None	None	None	None	Meningitis recovered; eye unimproved	Lumbar puncture established diagnosis. "Eye condition of nerve origin (?) in back of retina. (Amaurosis.)" (Capt. Heard.)
10	Pain in left ear	None	Pain in legs	None	None	Present on 15th day	Good recovery	Delirious 3 days. Uneventful recovery.
11	None	Conjunctivitis, 3-14-18	Bones, joints & mus. of leg ache	None	None	Present on 7th day of teatment for the relapse	Recovered	On 3-11-18 there was a return of the meningitis symptoms, on 3-13-18 lumbar puncture done and antimeningococcus serum administered. He has left on furlough, June 12, 1918, in good condition.
12	None	None	None	None	None	None	Recovered	Course uneventful.
13	None	None	None	None	None	None	Good recovery	Has made most rapid recovery in the whole series. Posterior nares negative to meningococcus. Blood sterile.

"THE CONTINUOUS INHALATION OF OXYGEN GAS IN PNEUMONIA AND IN OTHER DISEASES."*

BY ALBERT N. BLODGETT, M.D., BOSTON.

IN a paper by S. J. Meltzer, M.D., LL.D., published in the *New York Medical Record* for Oct. 19, 1918, appears an article upon "Insufflation of Oxygen in Pneumonia" (Vol. XCIV., p. 689), in which Dr. Meltzer refers to a paper published by him in the *New York Medical Record* (Vol. XCII., p. 1), upon "The History and Analysis of the Methods of Resuscitation; with a Description of the Author's Pharyngeal Insufflation Apparatus for Artificial Respiration in Man."

In the same paper Dr. Meltzer also refers to an article published by him in the *Journal of the American Medical Association* (Vol. LXIX., p. 1150), upon "The Therapeutic Value of Oral Rhymic Insufflation of Oxygen."

The paper appearing in the *Medical Record* of July 7, 1917, is a rather exhaustive account of the methods of treating asphyxia from early times to the present day, with an elaborate description of his apparatus for this purpose.

This apparatus, as described by Dr. Meltzer in his own words consists of: First, a bellows; second, a respiratory valve; third, a pharyngeal tube; fourth, a T-tube; fifth, a padded wooden board to be used for compressing the abdomen by means of belts. "All these ought to be kept connected and kept in readiness in a small handy bag. In addition to the described apparatus the bag ought to contain: (1) a stomach tube, (2) an appropriate tongue depressor, (3) a roll of tape, (4) a pair of scissors. Bellows, rubber tubing, etc., should be frequently examined for their efficient activity in order that the apparatus should not fail when its application is needed in emergency."

Dr. Meltzer continues: "When coming to a victim who requires immediate artificial respiration the order of procedure should be as follows: First, the application of the abdominal board in order to prevent the entrance of the insufflated air into the stomach and intestines; second, to pull out the tongue as far as possible by means of the forceps; third, to insert the pharyngeal tube of the readily connected apparatus as deep into the pharynx as possible with the flat side of the tube on the tongue. The tongue should now be tied to the tube by means of the tape—not too tight. The tying of the tongue has two purposes: (1) It prevents the falling back of the posterior end of the tongue and of the glottis, and (2) it keeps the pharyngeal tube in place. The working of the bellows with one foot, and the moving of the ring of the aspiratory valve with the thumb of the right hand should be started immediately on tying the tongue of the pharyngeal tube.*"

If any apology is due for my temerity in addressing the *Boston Medical and Surgical Journal* upon this subject after the lapse of twenty-eight years, it may be pleaded in my excuse that the researches of Professor Meltzer in seeking information upon inhalation of oxygen in pneumonia did not lead him to know that in 1890 I published a paper in the *Boston Medical and Surgical Journal* (Vol. CXXIII., p. 481) on "The Continuous Inhalation of Oxygen in Pneumonia and in Other Diseases," with a record of a case in which the oxygen was continuously given for *one hundred and six hours*, with recovery of the patient.

In the place of a battery of Ten Pieces of apparatus, such as no person less skillful than Professor Meltzer could possibly adjust (which must be obtained under his name from George Tiemann & Co., New York), I interposed only a simple wash-bottle between the tank of oxygen and the lips of the patient; the sole purpose of which is to regulate the flow of gas to the patient by the rapidity of the bubbles of oxygen from a small tube in the wash-bottle, by which I found that the rate of about one hundred bubbles in a minute of time sufficed to furnish an amount of oxygen to relieve the impending danger of suffocation, and its continued use was followed by recovery of the patient, from the impending calamity, after a period of *one hundred and six hours* of the *continuous inhalation of oxygen gas.*

* This was the title of the former paper of 1890. It is used here because Dr. Meltzer has ignored the principal features of the whole paper.

"* To my mind, the apparatus which is here described is practically the most efficient one for the execution of artificial respiration in cases of emergency. It is absolutely reliable; it is very easy to handle, and is comparatively inexpensive. My statements which are here made are based upon personal observations. I have, of course, very few opportunities of testing it upon human beings. I have hardly need to state that I have no other motive for pleading for the introduction of this apparatus into medical and Samaritan practice than a scientific and humanitarian interest. The manufacturers are spending immense sums of money for advertising and popularization of their machines. Their agents have no other means of demonstrating the possible usefulness of their respiratory apparatus than by showing its action upon a rubber bag. I need not discuss here the unreliableness of any of these demonstrations; neither do I need to discuss the insufficiency of the evidence derived from the testimony of some physicians. The apparatus, 'Meltzer's Pharyngeal Insufflation Apparatus for Artificial Respiratory Cases of Emergency in Man,' can be obtained from George Tiemann & Co., 107 Park Row, New York. It is not patented. Its cost is probably less than one-fifth that of the patented apparatus."

Dr. Meltzer's instructions are precise, and are transcribed in his own words: "When coming to a victim who requires the immediate artificial respiration (supposing that the "small" handy bag is obtained from Messrs. Tiemann & Co.) the order of procedure should be as follows: First, the application of the abdominal board in order to prevent the entrance of the insufflated air into the stomach and intestines; second, to pull out the tongue as far as possible by means of the forceps; third, to insert the pharyngeal tube of the readily connected apparatus as deep into the pharynx as possible with the flat side of the tube on the tongue. The tongue should now be tied to the tube by means of the tape—not too tight. The tying of the tongue has two purposes: (1) It prevents the falling back of the posterior end of the tongue and of the glottis, and (2) it keeps the pharyngeal tube in place. The working of the bellows with one foot, and the moving of the ring of the aspiratory valve with the thumb of the right hand should be started immediately on tying the tongue to the pharyngeal tube."†

"Dr. Samuel J. Meltzer of New York said that about eight years ago he constructed a simple apparatus for intratracheal insufflation for Dr. Carrel. He had seen in many cases of his experimental dogs in which the thorax was transversely opened widely, double pneumothorax. These dogs recovered without having had infection. In the course of the last year Meltzer demonstrated to several hundred military officers anesthetized and curarized dogs with the chest wide open. The entire heart was exposed to full view. The animals were kept alive and with normal blood pressure by the method of pharyngeal insufflation. The experiment never failed. He had often demonstrated a fact of practical importance, namely, that if artificial respiration was sufficient the heart could be handled freely with impunity. Artificial respiration was very useful during anesthesia, and was indispensable in major operations upon the thoracic cavity."

Dr. Meltzer states that "he has very little opportunity to test his apparatus upon human beings," and his experiments are accompanied by such fatal mutilation of the animals used in demonstration that it may well be doubted if he could prevail upon a "human being" to undergo the peril.

† From the *Medical Record* of Nov. 16, 1918.

In the presence of an *actual* Patient, in an *actual* Sickroom, it would seem that such a degree of detail and of apparatus might well consume so much time, which is of *Supreme Importance* in so imminent peril of death, that the victim would inevitably die before the arrangements could be completed; and the melancholy ministrations of the undertaker could be finished before the apparatus for resuscitation could be brought into application to the unhappy victim.

LOSS OF FAITH AS A WOEFUL OUTCOME OF TODAY'S SPECIALISM.

By Beverley Robinson, M.D., New York.

Scarcely a day passes without this sad truth being brought home to me, at the present time; and, unfortunately, the trouble does not grow less, but increases all the while. Let me give a few concrete examples.

A young woman, tired out nervously with war work, had a very painful facial neuralgia, which recurred during the night and was cured only with a nerve tonic and the use of repeated small doses of codein. Unfortunately, she was told, and, indeed, thought herself, that it was possibly due to her teeth. She consulted the dentist. He could find nothing apparently amiss, but thought it wise to have an x-ray picture taken by a radiologist. The result of this expert's investigation was to show what to him meant an abscess about the roots of two important teeth and extraction of one immediately, was advised. The other tooth, he thought, might possibly be saved by considerable refined dentistry. The patient then consulted another radiologist. He was not confident as to the proper interpretation of his radiograms and wished the patient to see another dentist. This she did, and he advised immediate extraction of both teeth. She finally consulted a third dentist. He reserved decision until he could see and determine the meaning of the radiograms. The patient has been much upset, has lost sleep and not unnaturally, since she has been informed that if she retains these diseased teeth (if they be so) she will suffer in health: and, indeed, that it has already been much and imminently jeopardized.

As I have stated, the painful neuralgia was entirely cured before the fresh dental work was begun and before either or both teeth were extracted. Alas, the pity of it!

A young married woman, with two small children, has for herself and husband a very able practitioner in every way, who is a hospital physician both to a general hospital and to a children's hospital. Albeit, he is not known as a pure child's specialist. The mother has imbibed the idea that he is not thoroughly competent to look after her children, because he is not so labelled. She gets this idea primarily from some of her kind friends. Again, she criticizes mentally because her own physician does not find it essential to exaggerate minor ailments and to institute all sorts of useless, very troublesome doings, by reason of the very modern foolishness of acidosis, a new term used to cover up a very old idea and to prey upon the tender nerves of too anxious mothers. Finally, the children's specialist, in a way, although prominent mainly as an obstetrician, calls and calls again to advise and control a system of modified feeding, internal medication and, above all, frequent saline, or alkaline high injections, necessitating the presence of a trained nurse and forced housing to an active little fellow whose whole disturbance could be mended with a few moderate doses of rhubarb and soda mixture and a little judicious limitation of his food, which was rather excessive.

I could go on *ad nauseam*, or *ad infinitum*, with examples. One more and I have done, except for a few moral, or philosophical reflections.

A patient has specks before his eyes. He consults several prominent oculists. None agrees wholly with the previous one. He is told it comes, possibly, from his kidneys. He is told there is thickening of the coats of the ocular vessels as seen with the ophthalmoscope. He is told he has eye strain and must not read, or use his eyes at all, or very little, for a time. He is told his eye-glasses are of no use; indeed, worse than useless. He must have a new pair, a very expensive one, because the formula of the new glasses is very complicated and requires the finest, most skilled work of the oculist and of the optician. His medical adviser of many years, who has already saved him more than once from the hands of the philistines, who would have made him mentally a wreck with declaration of chronic nephritis, and again with ulcer of the stomach, because of recurrent dyspepsia, now saves by simply stating that such specks often disappear as suddenly as they come and leave not a trace behind of any ailment of consequence.

Now where does all this lead except to one thought, namely, poor human beings who today are being exploited in many directions in medicine and surgery, not simply by quackery, but by those who are honest and well intentioned, we might admit, but who have themselves a concentrated over-valuation of their own special knowledge and hence ultimately the downfall of the patient's faith in medicine, or those who profess the calling.

To the old, time-honored practitioner, this is all lamentable in the extreme and should be remedied, if at all possible, now. But how? I know of only one way. Get your practitioner, in whom you believe, because you know he has education, experience, common sense, loyalty, disinterestedness, and stick to him. When he wishes a consultation, have it, but still believe in him and trust him above all others. If he can learn something useful to guide him, he will gladly avail himself of it; if he feels that you would be better off in the hands of another, for some special ailment and for a time, he will tell you so—but be sure that the specialist does nothing, at any time, that does not meet with his consent and approval. He is, and must be, the final consultant, and is the wisest, probably, of them all, and the one who is by all odds most valuable to you, and you should show your appreciation of it, not merely by a few words of passing thanks, but by paying him liberally for all he does for you and, surely, quite as much as you do to the physician who simply looks after a small piece of your bodily make-up and who gets a big, round fee, as a rule, for special skill, it may be, in a very limited direction, but who has not for you and many others "borne the burden and heat of the day" and never will.

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THE RAT AND INFANTILE PARALYSIS.

THE question of the rôle of the rat in the spread of infantile paralysis has aroused considerable interest and speculation. A pamphlet issued recently, "The Rat and Infantile paralysis—A Theory," by Mark W. Richardson, M.D., presents evidence which is conducive to the belief that this disease is due to a precedent infection of rodents. Dr. Richardson presents evidence against the human contact theory as a determining factor in the spread of this disease and suggests that the epidemiological facts could be better harmonized if one assumed an antecedent and underlying infection of rodents, and the mediation of the flea.

Whoever has seen a city slum street in summer cannot imagine more intimate personal contact than is enjoyed by the tenement children playing in the crowded, hot, dusty thoroughfare, and yet it appears that cases of infantile paralysis might be numerous in the tenements on one side of a street, with no cases whatever in similar houses opposite. In one district investigated, the contagion appeared to be quite sharply localized in the quadrangle formed by the tenements bounding a city block, and did not travel across the street in spite of all the human migrations and opportunities for direct and indirect contact. If human carriers could not carry the infection across the street, then it is equally improbable that the cases in the same block were transferred one to the other by human agency. On the other hand, the unrestricted migration of infected rats over the back yards enclosed by such tenement quadrangles would explain quite adequately the sharp localization of the human cases. A somewhat parallel phenomenon has been seen in plague conditions in India, where people of different castes never associate with each other. In spite of this absence of human contact, plague spreads from caste to caste. The explanation is, in the end, simple: although personal association is forbidden, the houses, fronting oftentimes on different streets, have adjacent back yards over which rats travel freely.

Up to 1890, bubonic plague had been restricted to certain well-defined areas of Asia but during the last twenty-five years, this disease has spread over the whole world. Within the same period of time, infantile paralysis, which previously had been noted in single small epidemics, has become world-wide in its distribution, with outbreaks much more numerous and of much larger size. This recent spread of plague may be attributed to the marked increase in the world traffic in grain, for no fact is better established than the intimate relation of bubonic plague to the grain business.

The fact that infantile paralysis occasionally invaded the homes of the well-to-do has been used as an argument against rodent infection as preliminary to human cases. It is, however, well known that rats may be present in localities where they would least be expected. Furthermore, pet animals might perfectly well carry to the children infected fleas. In bubonic plague it has been found that although the rat flea prefers its natural host, it can, in the absence of such natural host, be found on

practically all domestic animals. Furthermore, the human flea, *Pulex irritans,* has been found upon rats, and can, on occasion, transfer bubonic plague from animal to animal.

It is of interest to note that in bubonic plague the primary bubo is, in the great majority of instances, in the groin. This is, of course, because the flea reaches most easily the legs of his victim. In infantile paralysis, the vast majority of children are paralyzed in the lower extremities, either alone or in combination with other parts of the body. This marked excess of paralysis in the lower extremities is strong presumptive evidence that the infection takes place through the lower extremities.

Another point of similarity shown by infantile paralysis and bubonic plague is seen in the fact that it is rare to have more than one case in a single house or family.

The following conclusions are presented in this pamphlet:

1. Although the virus of infantile paralysis has been demonstrated in the secretions and excretions of persons sick with the disease, and (b) healthy third persons who have or have not been in contact with patients, and although such secretions and excretions may in animal experiment remain active for many months, the epidemiological facts are strongly against the theory that infantile paralysis is spread from person to person by direct or indirect contact. On the other hand,—

2. The epidemiology of infantile paralysis corresponds so remarkably with that of the bubonic plague, a disease known to be due to the rat and flea, that it can be stated with great probability that human infantile paralysis is due to a precedent and underlying infection of rodents.

3. As with bubonic plague, final proof as to the rôle of the rat and the flea in infantile paralysis must rest in elaborate laboratory investigation.

EPIDEMIC INFLUENZA AMONG AMERICAN SOLDIERS ABROAD.

DURING the course of the influenza epidemic, the infection has spread to a considerable degree among the troops of the American Expeditionary Forces. The United States Public Health report of November 22 contains a review of army conditions.

"During the past two months a second wave of severe influenza infection has swept over France and has spread to all the countries of Europe in about equal force. In the United States the onset of the epidemic was, as is usually the case with pandemics of influenza, about three weeks later than in London and Paris. The first and rather benign phase of the infection, it will be remembered, began in the middle of April and had largely disappeared in the American Expeditionary Forces by the end of July. The second phase, which has not yet reached its maximum incidence, has been characterized by a much higher percentage of initially severe cases, and particularly of pulmonary complications. Coming at the time of the rainy and changeable weather, this new invasion of infectious colds and coughs has been accompanied by a constantly increasing number of pneumonias. New replacement draft detachments arriving with each convoy have added the heaviest percentage of infected men per strength and have shown the highest percentage of complicating pneumonia. It has been a usual observation that when infections of the upper respiratory tract prevail, the incidence of meningitis in the community increases soon after, and this rule prevails at present. An increasing severity of the pneumonia is commonly found when the disease is permitted to pass rapidly through successive hosts."

The areas of heaviest infection of influenza, pneumonia and meningitis in the American Expeditionary Forces are the base ports, the depot divisions, and such training areas in both S. O. S. and advance zones as have received replacements or new organizations still including men exposed to the massive infection which has prevailed on the transports and on troop trains.

In order to prevent the frequently recurring infections introduced through base ports by incoming troops, unusual precautionary measures have been adopted. Men with colds, coughs and fevers are excluded from transports at ports of embarkation, and all troops are equipped with three blankets, an overcoat, and winter-weight woolen underclothing. The number of men carried on transports has been reduced to 80 per cent. of berth capacity, and

hospitalization capacity has been increased to four per cent. of the troops. Ready shelter has been provided for troops arriving at base ports and for a period of four days no heavy duty is required. There is now adequate medical supervision of troop trains. The concerted effort of all medical officers in the application of all measures of local sanitation in order to avoid further extension of influenza with its complicating pneumonias and often coincident meningitis has been required.

Special interest attaches to the statement concerning the mild epidemic of influenza in the American Expeditionary Forces preceding the severe epidemic now in progress. To many who have followed the course of events this will be a reminder of the mild griplike disease which prevailed in a number of cities in this country last winter. Is it possible that there was a direct relation between these outbreaks? It would be interesting to have available accurate information regarding the prevalence of a griplike infection in various parts of the United States last winter and to see what effect, if any, this had apparently exerted on the course of the severe influenza epidemic just passing. It will be noted that in the American Expeditionary Forces, "the heaviest percentage of infected men per strength and the highest percentage of complicating pneumonias" occurred among new replacement draft detachments. Is it possible that the other men possessed a certain degree of immunity because of the earlier mild outbreak?

MASSACHUSETTS MEDICAL SOCIETY: ANNOUNCEMENT.

The attention of the members of the Massachusetts Medical Society is called to the slip which will be found in this copy of the Journal at the index page. It is hoped that the Fellows of the Society will take advantage of this reminder and pay their dues promptly, without waiting to receive a personal bill. This will greatly aid the work of the district treasurers. A. K. Stone, *Treasurer.*

MEDICAL NOTES.

Influenza in Samoa.—Six thousand deaths due to influenza have occurred in Samoa. The Australian Government has dispatched a medical staff.

The Wisconsin Anti-Tuberculosis Association.—The program of the annual meeting of the Wisconsin Anti-Tuberculosis Association in Milwaukee, on December 13 and 14, centered about the establishment of free and pay tuberculosis clinics in every suitable Wisconsin county, and was, therefore, of particular interest to physicians.

At the meeting a public health program for the ensuing year was offered, with particular emphasis on tuberculosis. Changed conditions, in particular the uncovering of a large number of cases of incipient tuberculosis among discharged soldiers and draft rejects, have convinced the association that the next link to be forged in the chain of defenses against tuberculosis is the dispensary.

Dr. Michael M. Davis of Boston, one of the foremost authorities on clinics in the country, told of his experience. The meeting was also addressed by Prof. John R. Commons of the University of Wisconsin, and Dr. Donald B. Armstrong, head of the famous Framingham, Massachusetts, experiment, who described a community organized against tuberculosis.

Friday morning and afternoon sessions were held at the Association headquarters, 471 Van Buren street. At the Friday evening dinner at Gimbel's Grill, there were speakers of national reputation. Mr. H. O. Seymour, manager of the Red Cross Christmas Roll Call, acted as toastmaster.

For Better Rural Health.—Much remains to be done in rural districts, according to the annual report of the Secretary of Agriculture, to control such pests as mosquitoes and the hookworm, to eliminate the sources of typhoid fever, and, even more, to give the country districts the advantage of modern hospitals, nursing and specialized medical practice.

Noting that many agencies, some of them private enterprises with large funds, are working for improvement, the report says that the Department of Agriculture, through its home demonstration service, is giving valuable aid, and the public health service is increasingly extending its functions.

To what extent the further projection of effort is a matter for State or local action re-

mains to be determined, says the Secretary, but it seems clear that there should be no cessation of activities until there has been completed in every rural community in the Union an effective sanitary service and, through the provision of adequate machinery, steps taken to control and eliminate the sources of disease and to provide the necessary modern medical and dental facilities, easily accessible to the mass of the people.

WINTER HIBERNATION OF ANOPHELES LARVAE.—It has been accepted generally that with the advent of cold weather anopheles become inactive, and upon the freezing over of the water, or even before, they are destroyed. Investigation of conditions in America show that this is not always true. The following observations reported in the Public Health Report for November 15 are of interest in this connection.

1. Anopheles (*crucians* and *punctipennis*, at least) pass the winter in the larval stage. This is true for northern Louisiana (for *crucians*) during a severe winter for that section. Evidence, though less conclusive, shows that *punctipennis*, at least, in the larval stage withstand a severe eastern Virginia winter.

2. Apparently pupation does not occur at low temperature, or until ordinary room temperature obtains.

3. In selected places considerable numbers of anopheles larvæ pass the winter as such.

4. Larvacides should be applied in the fall sufficiently late to kill the last batch of larvæ, or before season suitable for the completion of their aquatic stages in the spring.

CRAIG COLONY FOR EPILEPTICS.—The Craig Colony for Epileptics, located at Sonyea, New York, was founded in 1894, and has been maintained by State appropriations. As originally designed, it was the plan of the promoters of the Colony to provide housing and maintenance for at least two thousand patients. This is the ultimate capacity toward which the Colony is progressing.

The twenty-fourth annual report describes the condition and activities of the patients. The importance of increasing the facilities for every possible occupation is emphasized, both from the remedial effect which it has upon patients and for the real economic value of their work. Gardening, agriculture, forestry, brick-making, and tile-making have offered a diversity of occupations. Many of the children have been educated in the lower scholastic branches and in manual work to quite a degree. Patience, tact, and the ability to recognize psychic conditions have been of fundamental importance in working with patients.

During the year, there were several cases of measles, scarlet fever, and diphtheria, causing one death. Forty-two patients left the Colony without permission. Of these, twenty-seven were returned, ten reached home, and four were not accounted for. 1467 patients were admitted during the year. Since the opening of the Colony in 1896, there have been 4,687 patients under treatment, 80 of these have been discharged as recovered, 628 improved, 779 unimproved, and 152 insane. The report contains information about the prognosis and treatment of epilepsy, and includes the case histories of more than 125 patients.

MUNICIPAL COURT OF CHICAGO.—The court offers insight into many conditions of scientific, as well as legal, interest. In the tenth and eleventh annual reports of the Municipal Court of Chicago, the importance of psychopathic investigation is shown by the following ten conclusions, which have been drawn from the material presented in the reports:

I. That delinquency and defectiveness are practically synonymous, the principal forms of defectiveness being dementia precox, psychopathic constitution and feeble-mindedness, alone or in various combinations, psychopathy being the more active instigator, feeble-mindedness the more passive.

II. That defectiveness is also practically at the bottom of most of our dependency, unemployability, alcoholism, asociability, wife desertion, etc.; in fact, is synonymous with sociopathology, and is undoubtedly playing an important rôle in many other mental and physical diseases and accidents.

III. That in the matter of sociopathy, psychopathy (heredity) is an intrinsic factor and environment an accessory factor.

IV. At large, defectives, socially, economically, industrially, in Army and Navy, are a heavy economic and social burden. In appropriate institutions, this burden is to a large degree eliminated.

V. That annually, with statistical punctiliousness, there is a new quota of defectives thrown on the community, that will have to be reckoned with throughout their career.

VI. That these cases run true to form, whether it be in school, business, or socially.

VII. That our laws, penal institutions, and sociological efforts have all handled the problem thus far objectively, completely ignoring the subjective side, the individual himself, with only failure to record. Sociologically, hereafter, just as we have learned in medicine, we will have to "treat the case."

VIII. That new laws and institutions conforming to scientific advance are demanded.

IX. That all courts should have psychopathic laboratories at the service of both sides of a case. Cities should maintain laboratories, where school

children and others may be examined and disposition advised. By recognizing defectives early, they can be committed to colonies and crime anticipated to the advantage of the individual and his family, as well as society.

X. That universities should provide training along these lines in order that we may have enough properly trained and equipped experts to carry on the work and extend research in these fields. Brain laboratories are badly needed adjuncts. Medical and law students and students of sociology should have adequate instruction along these lines.

WAR NOTES.

PREVENTION OF DISEASE FROM RETURNING SOLDIERS.—In an address before the American Public Health Association, Surgeon-General Rupert Blue, of the United States Public Health Service, pointed out the need of special vigilance on the part of health authorities in order to prevent the introduction and spread of dangerous epidemic diseases by our returning soldiers. Furthermore, he urged wider interest and a greater participation on the part of the people in public health work.

"The work of the medical department of the British, French and American armies has shown," said Dr. Blue, "what could be accomplished by well-planned, thorough-going health measures. When the history of the present war is written, not the least significant part will be that which records the achievements in the field of preventive medicine. Anyone familiar with the histories of other wars will realize that hundreds of thousands of lives have been saved as a result of the excellent work in sanitation and preventive medicine carried on by the British, French and American military forces."

Presenting a program which called for intensive health work carried on by the United States Public Health Service in coöperation with state and local health authorities, Surgeon-General Blue insisted that "what can be done among soldiers in the unfavorable environment of war, can and should be done among the civilian population in the more favorable environment of peace."

Dr. Blue deplored the fact that it was so difficult to interest the general public in matters relating to sanitation and preventive medicine. Well planned health work, he said, constituted really wise economy, for it not only conserved our national strength, but actually reduced expenditures for the treatment and care of illness and death.

The program prepared by the United States Public Health Service suggests that much of the work can best be carried out by a plan which provides for Federal and State participation in local health work whereby each bears a portion of the expense. Special emphasis is laid on matters dealing with industrial hygiene, on improved rural sanitation, the prevention of diseases of infancy and childhood, and on popular health education. In connection with the last named, the Public Health Service contemplates constituting itself a national center and clearing house for information, advice, and educational assistance on all matters relating to public health and hygiene.

ARMY PRECAUTIONS AGAINST THE SPREAD OF DISEASE.—Secretary of War Newton D. Baker has replied to Governor McCall's recent letter urging that proper precaution be taken to prevent the spread of disease in this country as a result of the return of troops from abroad. The dangers particularly feared by Governor McCall were bubonic plague, cholera, typhus fever, and meningitis.

Secretary Baker has given assurance that the troops will be examined very carefully and given appropriate treatment before they are embarked in France, and that, in addition, a considerable number of beds will be available in army hospitals in Boston and at Camp Devens for returned soldiers. The facilities at the disposal of medical authorities will undoubtedly be sufficient to protect the civil community against the dangers of the transmission of infectious diseases from abroad.

When the steamship *Canopic* arrives with returning soldiers the men will be taken immediately to Camp Devens, where they will be quarantined and mustered out of service.

It has been announced that the West Department of the Boston City Hospital, the old Parental school building in West Roxbury, has been equipped as Boston's base hospital. It offers facilities for the care of nearly 400 men. All cases which go to the new base hospital will be distributed from there to specializing hospitals, and all reconstruction cases will be sent to General Hospital 10, the reconstruction hospital on Parker Hill, Roxbury, combining the Robert B. Brigham and the Elks' Hospitals.

Colonel Albert S. Williams has announced that the Commonwealth Armory, which will

be abandoned by the United States Guards on December 12, may also be used as a receiving hospital. No man who is ill will be discharged from the service. He will be retained and treated or receive reconstruction care until he will not need to be a burden to industry and society. Men incapacitated will receive full compensation for disability from the Government. Efforts will be made to send men to hospitals near their homes before they are discharged.

WAR RELIEF FUNDS.—On December 17, the totals of the principal New England war relief funds reached the following amounts:

Belgian Fund	$721,590.08
French Orphanage Fund	416,201.47
Italian Fund	232,488.83
Lafayette Fund	45,168.41
British Fund	21,139.66

CAPTAIN DOLOFF TRANSFERRED.—Captain Eugene Doloff, who has been in charge of the medical work at Commonwealth Armory, will transfer to the Rufus S. Dawes Hotel on Pine street, on December 12, to be medical officer to the detachment of the 36th Infantry, which will be quartered there.

STUDENTS TO GIVE PLAY FOR SOLDIERS' BENEFIT.—Students of Harvard University and Radcliffe College will present the farce, "Plot and Playwrights," under the auspices of the 101st United States Engineers' Welfare Association, at Jordan Hall on December 17.

NAVY HEALTH CONDITIONS.—The health conditions in the Navy have been excellent and the mortality rate has been low during the war In his annual report, Admiral Braisted, Surgeon General of the Navy, attributes this largely to the increasing appreciation by commanding officers of the rules of hygiene and sanitation. He believes that where defects in the health system have developed, the country's unpreparedness for operation of such magnitude has been the cause.

Compared with an annual rate of 2.7 per 1,000 for ten preceding years, the rate rose during the first quarter of this year to 8.9 per 1,000 per year. Dr. Braisted has expressed the belief that this was due to the circumstances caused by the rapid expansion of the Navy and the unusual weather conditions of the first quarter of the year. The death rate for the second quarter was low, 3.3, a figure closely approaching the average for peace times. The hospital admission rate for the calendar year of 1918 will probably be lower than the average in peace times. During the year, 193 men were drowned, 30 died from exposure, and 47 were killed by gunshot wounds.

Dr. Braisted declares that the war has served to clear the reputations of the men of the Army and Navy of the impression in the public mind that diseases, due to social evils, were more prevalent in the service than outside. The Navy Medical Department began an organized fight against these diseases fifteen years ago, and the conscience of the country has been aroused, until a nation-wide campaign is being waged, not only against the evils themselves, but also against the underlying social conditions on which they flourish.

ARMY HEALTH RECORD.—In his annual report, Surgeon General William C. Gorgas stated that the health of the American Army, both at home and overseas, has been excellent, and that the mortality rate from disease is lower probably than that of any similar body of troops in the history of warfare. Complete statistics of deaths in Army camps are not included in the report, which covers only the fiscal year to June 30, 1918. In 1917 total deaths from disease were 2984 and the death rate per thousand 6.3. This compares with a seven-year average of 4.9 per thousand.

Contrasting this report with that of previous years, Gen. Gorgas points out that if the morbidity of typhoid fever had been the same as in 1898 there would have been 1400 deaths from that disease alone, whereas there were only 23.

Measles is placed at the head of the diseases causing deaths, although the report shows that 65 per cent. of the deaths were due to resultant pneumonia.

COMMISSIONED OFFICERS LEAVE CAMP DEVENS.—Ninety-eight commissioned officers from the infantry and medical corps were released from service at Camp Devens on December 6. Major Samuel J. Mixter of Boston was the highest ranking officer to leave the service. On December 10, one hundred additional officers will be discharged and will return to their homes.

BOSTON AND MASSACHUSETTS.

During the week ending December 7, 1918, the number of deaths reported was 254 against 240

last year, with a rate of 16.89 against 16.20 last year. There were 37 deaths under one year of age against 36 last year.

The number of cases of principal reportable diseases were: diphtheria, 50; scarlet fever, 24; measles, 5, whooping cough, 9; tuberculosis, 36.

Included in the above, were the following cases of non-residents: diphtheria, 3; scarlet fever, 1; tuberculosis, 7.

Total deaths from these diseases were: diphtheria, 4; whooping cough, 2; tuberculosis, 20.

Included in the above, were the following non-residents: diphtheria, 1; tuberculosis, 3.

FAULKNER HOSPITAL.—The fourteenth annual report of the Faulkner Hospital, Boston, records an unusual increase in the number of patients cared for. 839 persons were admitted to the hospital and 15,188 days' treatment was given—225 patients more than the previous year and 4,516 more days' treatment given. This is partly due to the opening of the New Maternity Building and to the care which has been extended to men from the radio school in Cambridge, who were received at the rate of 15 men a day for 3 or 4 months.

The maternity building was opened in August, 1917. Since that time, there have been 133 births in the hospital, which is more than twice the number of the preceding year.

X-ray apparatus has been installed. The laboratory work has been increased and the experiment is being tried of having a fourth year student from the Harvard Medical School live at the hospital and take charge of the routine work.

The hospital needs a nurses' home, in order to devote the entire maternity building to patients.

NEW INFLUENZA CASES.—The latest report to the Health Department includes forty-seven new cases of influenza. This figure is higher than for several preceding days, but the cases are comparatively mild. Health Commissioner Woodward has reiterated his plea for the exercise of caution on the part of the public in avoiding those who are infected with the disease. Over 1030 cases have been reported throughout the State during the recurrence of the epidemic. The victory celebration and congestion in elevated trains are regarded as the sources of the new cases.

In Brockton 121 cases have been reported, but most of them are not severe and many are hardly more than colds.

On December 2, 30 new cases of influenza among the civil population were reported to Health Department officials. The deaths have been fewer, with but two of influenza and two of pneumonia, as against five of influenza and three of pneumonia reported the day before. Health Commissioner Woodward has reiterated his belief that the disease is abating.

DELAY IN REPORTING CASES OF INFLUENZA.—State Health Commissioner Eugene R. Kelley, in a recent letter to Gov. McCall on the cause of the recent influenza epidemic, intimates that the disease might have been checked earlier if the first cases discovered at the Commonwealth Pier and in hospitals had been more promptly reported to the health authorities.

The Health Commissioner is reported to have said:

"The bacterial cause of this outbreak is not yet known. A carefully conducted investigation seems to demonstrate that the suspected bacillus influenzae of Pfeiffer is not the true cause of the disease and to raise considerable doubt if it is even implicated.

"The means by which it is spread and the conditions which favor its malignancy are not known. Particularly in reference to the latter point we are still in the dark and can only point to the general sanitary rule that overcrowding is to be avoided.

"A vaccine made of killed influenza bacilli has been used with our authorization in the hope that it might prove of value. The records from a large institution where careful observation was possible seem to show that it was of practically no value as a preventive, although certain other observers under less favorable conditions for observation believe it has real value.

"The history of past outbreaks of influenza has proved the incompleteness of our knowledge in regard to the disease. It has repeatedly swept over all barriers that could be raised against its progress and has encircled the globe. What knowledge we have of its cause and channel of travel is clearly inaccurate, for this outbreak has again followed in the footsteps of previous ones and has swept over us.

"This department was first notified of the presence of the disease by an officer of the Navy Department calling attention to its presence on Commonwealth Pier. We have since been in

formed by hospital authorities in Boston that they had been having a number of cases at that time, but that they had not notified us of the fact.

"This epidemic has been a most serious one. It has killed an appalling number of our people and it has directly and indirectly caused the expenditure or loss of large amounts of money and has temporarily halted the progress of many industries."

U. S. MEDICAL CORPS.—At a recent meeting in Ford Hall of the prison committee of the National Civic Federation the conditions prevailing in correctional institutions in this state were discussed. Major A. N. Thompson of the medical corps, U. S. Army, described the work being done by the medical corps in Massachusetts in dealing with a class of diseases which furnish a constant problem for prison authorities.

MORTALITY OF INFLUENZA IN MASSACHUSETTS.—According to the most reliable data obtainable by the State Department of Health there were about 15,000 deaths in Massachusetts as a result of the influenza epidemic. In all there were about 300,000 cases of influenza and pneumonia.

Although the exact figures are not obtainable at present, the estimates are made on the most reliable information at hand. The number of cases will not be known, as influenza was not a reportable disease by the Health Department until October 14. Returns of all deaths in the State are made by cities and towns to the Secretary of State, but it will be several months before those figures are available. It is stated unofficially that at present about 500 cases of influenza are being reported daily to the State Health Department. When the epidemic was at its height, 7000 were reported every day.

At the Wentworth Institute, Boston, no additional influenza cases have been reported recently from the student body. No cases have developed at any other station, fort or school in this vicinity.

In Brockton, 50 new cases of influenza were reported to the Board of Health on December 7, as compared with 78 cases the day before. The epidemic is serious, but the health authorities are not alarmed, as they feel that it will be held in check by the local physicians without outside aid. The nursing problem is causing some concern. Two trained nurses have been sent to Brockton by the State Board of Health to assist the local nurses.

In Whitman, there were 507 cases of influenza and 27 of pneumonia reported to the Board of Health for the week preceding December 8, when 36 new cases were reported. At a meeting of the Board of Health it was voted advisable to close the schools and forbid public gatherings. Two nurses have been secured to assist the Visiting Nurse Association and attempts are being made to secure additional nurses.

In Boston and vicinity there has been a slight increase in the number of new cases. On December 8, 56 cases of influenza and 1 death were reported, together with 9 new cases of lobar pneumonia and 7 deaths from this cause. On December 9, there were reported 46 new cases of influenza with 6 deaths and 1 new case of lobar pneumonia.

About 125 cases of influenza have been reported to the Randolph Board of Health recently, and while a majority of the cases are mild many cases of pneumonia have developed. The schools may be closed and public gatherings forbidden at any time until the epidemic is under control.

On December 10, 29 new cases of influenza were reported in Waltham.

HARVARD UNIVERSITY MEDICAL SCHOOL.—A meeting for the award of honors to students of medicine was held in the amphitheatre of the Administration Building, Harvard University, on Monday evening, December 16, at 8.15 o'clock.

President Lowell was present and an address was delivered by Dr. Graham Lusk. Dean Edsall presented the diplomas to students of the first rank in the second, third and fourth classes.

Following the meeting an informal reception was given by the Students' Association.

WOMAN PHYSICIANS AT LONG ISLAND HOSPITAL.—For the first time in the history of the Long Island Hospital, a woman has been appointed acting resident physician. Dr. Anna E. Steffen will succeed Dr. L. H. Rockwell. Dr. Rockwell entered the war service some months ago, and has been assigned to Fort Oglethorpe, Georgia. Dr. Steffen has been house officer since January. She is a graduate of Tufts medical school, class of 1913.

Miss Mary A. Morris has been appointed superintendent of nurses at Long Island Hospital.

The Problem of Feeble-Mindedness.—At the opening of the fiftieth session of the Massachusetts Conference of Charities in Springfield on December 5, the importance of taking measures to prevent the spread of feeble-mindedness was urged by the delegates, who believe that this is one of the most important of the social reconstruction problems.

Among the speakers were Dr. Walter E. Fernald, superintendent of the State School for Feeble-Minded at Waverley; Dr. George M. Kline, chairman of the Commission on Mental Diseases; Miss Amy Woods, general secretary of the League for Preventive Work, and Edward M. Hartman, secretary of the Massachusetts Civic League.

Increase in Influenza Cases.—A Recent report to the Health Department for a period of twenty-four hours includes forty-one new cases of influenza and two of lobar pneumonia. Twelve deaths have been reported. This number shows an increase in the number of cases.

At Wentworth Institute, Boston, twelve cases have developed recently among the members of the Students' Army Training Corps and technical training detachments. The patients have been sent to the Fort Banks Hospital, Winthrop. The fact that the men are demobilizing will make unusual precautions necessary.

On December 5, thirty-five new influenza and six pneumonia cases were reported for a twenty-four hour period. This figure is lower than for the preceding day. Four deaths from influenza and four of pneumonia have occurred in this time. Health Commissioner Woodward has expressed the belief that this fluctuation will continue for several days.

Influenza.—Influenza and pneumonia caused 91,386 deaths in forty-five large American cities between September 14 and November 23. Boston stands fourth in the list with 3,481 deaths due to influenza and 975 to pneumonia.

Massachusetts figures include: Cambridge, 387 influenza and 110 pneumonia; Fall River, 620 influenza and 82 pneumonia; Lowell, 151 influenza and 381 pneumonia; Worcester, 633 influenza and 257 pneumonia.

Eighteen new cases, with but two deaths, of influenza and pneumonia, were reported to the Health Department on November 29 for the twenty-four preceding hours. These figures are lower than for several days. Several new cases have developed among army men.

In Holliston, Massachusetts, the public schools have been closed because of influenza. There are many cases in Framingham.

Obituaries.

JAMES JACKSON PUTNAM, M.D.

Dr. James Jackson Putnam, for nearly fifty years identified with neurology in Boston, his native city, died suddenly November 4, at his home, of angina pectoris.

It is not within the limit of this notice to give in detail the events of his peculiarly energetic life nor anything like a complete list of his accomplishments in the diversified fields of his activities. The outstanding facts may be summarized inadequately as follows: Born in Boston, October 3, 1846, the son of Charles Gideon and Elizabeth Cabot (Jackson) Putnam, he had as his heritage the best traditions of a distinguished ancestry. His paternal grandfather, Samuel Putnam, of the Harvard class of 1787, was for many years Judge of the Supreme Court of Massachusetts. His father was a physician of distinction and his mother was a daughter of Dr. James Jackson, one of the most notable figures of his day in American medicine, an appreciative memoir of whom Dr. Putnam published in 1905.

Dr. Putnam was graduated at Harvard College in the class of 1866 at the early age of 20, already a student of high promise. Following his graduation from the Harvard Medical School he became a house-pupil at the Massachusetts General Hospital and thereafter continued his medical education in Leipsig and Vienna under the instruction of Rokitansky and Meynert. He also visited Paris, and later England, where he came into intimate relations with Huylings Jackson, for whom he had always the warmest admiration.

With this equipment and with the enthusiasm of a pioneer in a hitherto largely neglected branch of medicine, he forthwith became identified with study of the nervous system, both

in its normal and pathological relations. He was appointed a lecturer on nervous diseases at the Harvard Medical School in 1872, and established the neurological clinic at the Massachusetts General Hospital. In 1893, his long years of teaching and devotion to his chosen subject were rewarded by his appointment as first Professor of Diseases of the Nervous System at the Harvard Medical School. In this capacity he served until 1912, when he was retired by reason of age and made Professor Emeritus.

Dr. Putnam was one of the charter members of the American Neurological Association and was the last survivor for some years of the group of men who founded the society in 1874. He was also a member of the American Academy of Arts and Sciences, of the Association of American Physicians, the American Medical Association, the American Association of Pathologists and Bacteriologists, the American Psychopathological and Psychoanalytical Associations and many State societies, and took frequent part in their meetings and discussions. From its beginning he was a particularly active member of the Boston Society of Psychiatry and Neurology and was one of the leaders in its deliberations. At the last meeting of the Massachusetts Medical Benevolent Society, held a few days before his death, he was made one of its trustees. His eagerness to serve was exemplified in his unwavering interest in social and civic organizations:—the Associated Charities, especially of late, its committee on the alcoholic problem, and the social service movement, to all of which he gave much time and thought.

To estimate at anything like its true significance the life of such a man is, indeed, a difficult task. Possibly our purpose may best be served by an effort to appraise some of his more conspicuous activities.

To be a leader in an untried field demands exceptional qualifications. When he returned from Europe to this country in the early seventies, he had the conviction firmly fixed that the time had come for America to do her part toward developing the practical study of the nervous system. He had few sympathizers and fewer followers, but to a man of his type this was a stimulant rather than a deterrent, and he forthwith started the neurological clinic at the Massachusetts General Hospital, to which was assigned one small room, and began to teach and to investigate. By degrees the clinic grew, an occasional assistant appeared, and a department which has since attained goodly proportions was permanently established. To a man of less persistence and determination the difficulties would have seemed too great and the road too hard. He lived to see this department of the hospital work, so humbly inaugurated, transferred finally to its present adequate quarters with an increasingly large staff, but his ardent hope that sufficient beds to serve as a complement to the out-patient department be provided has not yet been realized. It would be a fitting and appropriate memorial could such a service be provided. In spite of this serious handicap, the years of his association with the hospital were productive of work and investigation of extraordinary thoroughness and originality. During these earlier years, in lieu of other facilities, he maintained a neuropathological laboratory in his house, the forerunner of the present Department of Neuropathology at the Harvard Medical School. In this laboratory was done much of his pioneer pathological work.

As a teacher of elementary students he was perhaps not so successful as in his other activities. The subject was considered difficult, it was optional, and the average student looked askance at the extra work it entailed. The very profundity of the teacher's knowledge stood in the way of its transmission to the somewhat unwilling student of the earlier days. A certain difficulty in clear exposition of fundamental principles, induced by a conscientious desire to state all the facts of a complex subject rendered his clinical lectures often hard to follow. To the more advanced student this very thoroughness was a decided help and inspiration; as a teacher of those already somewhat conversant with the subject he succeeded in imparting his really extraordinary knowledge more satisfactorily than to the novice.

Dr. Putnam was a master of good English. He wrote extensively and always with painstaking care. His published work of approximately one hundred titles covered a wide range of topics, to all of which he brought originality of thought and expression. Among the most notable of his earlier contributions were an investigation on lead and arsenic poisoning, a study of paresthesia of the hands and a paper on "A Group of Cases of System Sclerosis of the Spinal Cord." The two latter papers, published respectively in 1880 and 1891, were pioneer contributions of great significance which, owing presumably to the somewhat in-

volved wording of their titles and consequent difficulty in indexing, have not received the full recognition which is their due. In 1898, he published papers on internal secretions and splanchnoptosis and again he anticipated our more recent views in an article on the "Psychical Treatment of Neurasthenia." His first interest was mainly with the problems of organic neurology, but during his later years his attention was turned rather toward the functional aspects of nervous disease, an interest which was greatly intensified by the advent of the psychoanalytic movement. The practical application of psychological methods to the problem of behavior in the large sense, as elaborated by Freud and his followers, made an immediate and insistent appeal, and thereafter up to the time of his death he was constantly at work in the attempt to elucidate the deeper significance of the mental life on the basis of the psychoanalytic method. During this period many papers appeared from his pen; his mind was never more active and he bore for the most part with equanimity, but with an occasional burst of indignation the cynical and often abusive criticism aimed not so much at him personally as at the principles in which he believed. It is not to be questioned that when the heat of discussion over the newer psychological theories has subsided his thoughtful and searching papers will come to be regarded as contributions of permanent value in relation to this turbulent phase of medical research. Antedating somewhat this more recent and polemic period his Shattuck lecture before The Massachusetts Medical Society, delivered in 1899, with the original and suggestive title, "Not the Disease Only, but also the Man," revealed in striking fashion his catholicity of view, his belief in the significance of the mental life in the consideration of disease and his conception of the physician's duty toward himself and toward his patient—a masterpiece of expository writing.

His natural mental tendencies led him early toward philosophical inquiry. He was a close personal friend of the late Professors James and Royce and followed eagerly the recent philosophical movement as represented by Bergsen. His constant attempt during the later years was to bring into accord fundamental philosophical conceptions and the practical affairs of life. He believed that the psychoanalytic movement might help toward this end in spite of its incompleteness in that it failed to correlate the ultimate spiritual demand with the practical details of individual experience, and much of his later writing, as, for example, his book on "Human Motives," was concerned with the endeavor to bridge this gap. Dr. Putnam combined in unusual degree the mental qualities of the man of science and the philosopher. "Physics," he said, "can come to its rights only through metaphysics."

Always keenly alive to the misfortunes of others it was natural that he should have become one of the prime movers in the medical social service movement. From its inception he identified himself with its interests at the Massachusetts General Hospital, served on its committees and through example and in more material ways advanced the cause in which he ardently believed. In this, as in all other good causes, he took his part with a modesty and self-abnegation which was a constant source of marvel to those who knew of his manifold activities. Like his late brother, Dr. Charles P. Putnam, and other members of his family, he was a force for good in the community which was the stronger because exerted in ways which avoided publicity and popular recognition. His mind was always open to new ideas; he was almost childlike in his eagerness to see new light on old problems and to the very end he progressed and expanded. His liberality of thought was altogether admirable. With strong conviction on many subjects, he was peculiarly tolerant of the opinions of others and always willing to absorb and incorporate with enthusiasm into his own theories the conclusions of his fellow workers.

His really extraordinary modesty which in another might have appeared almost an affectation, made him a charming and stimulating companion. His understanding sympathy with human difficulties and weaknesses brought to him many, who were not patients, for advice and admonition. How many he helped over hard places can never be known, but his death, while at the height of his activities, leaves behind the memory of a man indefatigable in good works which knew no abatement even in the physical suffering of his last year.

With his interest in the more serious affairs of life went an unusual capacity for the simpler pleasures. His Adirondack camp, which he shared for years with his friend, the late Dr. Henry P. Bowditch, was a perennial source of interest, where from time to time he entertained

many notable persons. He was accustomed always to spend the month of September in this Adirondack camp, even after establishing his summer house at Cotuit, on Cape Cod, where he sailed his boat and worked in his garden with unvarying enthusiasm. He found it difficult, however, even in these periods of recreation, wholly to lay aside the problems which were always pressing for solution, as attested by the book or article he carried with him and his tendency always to turn conversation into serious and profitable channels. The war, happily ended a few days after his death, was to him a matter of almost personal sorrow; his attitude toward it was characteristic; it was as if he felt himself in some way personally responsible for the misdeeds of his fellow-men and suffered accordingly.

In many ways Dr. Putnam was in advance of his time. To such men adequate recognition, not alway accorded in life, is sure to come in increasing degree as the years lend just perspective to our view. It cannot be doubted that such will be the case with him. He lived through a period of medical and social unrest and did his full share towards the establishment of the new order, combining, as few men have, a wholehearted and impartial devotion to his family, to his friends, to his profession and to the community.

SAMUEL ABBOTT GREEN, M.D.

THE death of Dr. Samuel A. Green at the Hotel Lenox, Boston, on December 5, will be mourned by many. He was born in Groton on March 16, 1830, and was the son of Dr. Joshua Green and Eliza (Lawrence) Green. He prepared for college at Groton Academy and graduated from Harvard University in 1851. Having decided on a medical career, he entered the office of Dr. J. Mason Warren, later attended a course of lectures at Jefferson Medical College, Philadelphia, in 1851 and 1852, and then came back to Boston for study at the Harvard Medical School, from which he was graduated in 1854. Dr. Green then went to Paris to continue his medical study, and in 1854-55 he returned to Boston to practise. It was on May 19, 1858, that he was commissioned surgeon of the Second Massachusetts Militia Regiment by Governor Banks. On the breaking out of the Civil War he entered the service as assistant surgeon of the First Massachusetts Regiment, and bore the distinction of being the first medical officer of the State to be mustered into the three years' service. He was surgeon of the Twenty-fourth Massachusetts Regiment from September 2, 1861, to November 2, 1864, and had charge of the hospital ship *Recruit* in General Burnside's expedition to North Carolina, and later of the hospital steamer *Cosmopolitan* on the coast of South Carolina. He was chief medical officer at Morris Island during the siege of Fort Wagner in the summer of 1863, and was post surgeon at St. Augustine, Fla., in October, 1863, and at Jacksonville in March, 1864. He was with the army at the capture of Bermuda Hundred in May, 1864, and was acting staff surgeon in Richmond for three months following the surrender of that city in April, 1865.

It was in 1864 that he was breveted lieutenant colonel for "gallant and distinguished services in the field."

Dr. Green organized a cemetery on Roanoke Island, one of the first regular burial places for Union soldiers during the war.

For six years after the war, Dr. Green held the position of superintendent of the Boston Dispensary. He was then appointed city physician, and during eleven years, the performance of these duties endeared him to thousands by his tender devotion to the poor and the unfortunate.

Dr. Green's interest in city affairs led to his election as mayor. He discharged the duties of his position worthily, and though the remainder of his life was devoted to his profession and to literature, he never lost his interest in public affairs.

During his life Dr. Green held many positions of trust and was a member of numerous societies. He served as a member of the School Board in 1860-62 and in 1866-72, as trustee of the Boston Public Library in 1868-78, and as acting librarian in 1877. He was a fellow of the Massachusetts Medical Society, a member of the Boston Society for Medical Observation, of the Boston Society for Medical Improvement, of the American Philosophical Society of Philadelphia, of the State Board of Health, Lunacy and Charity, president of the Channing Home for Consumptives, overseer of Harvard University; trustee, secretary and general agent of the Peabody Education Fund, a member of

the Board of Commissioners to investigate the condition of the records, files, papers and documents in the State Department of Massachusetts, editor of the *American Journal of Numismatics,* and president of the American Numismatic Society. In 1896 the honorary degree of LL.D. was conferred upon him by the University of Nashville, Tenn.

Although his life was filled with innumerable interests and activities, Dr. Green found time to write many books and pamphlets, among which are the following publications:

"My campaign in America," a journal kept by Count William de Deux-Ponts, 1780-81, translated from the French M.S., with an introduction and notes; "The Story of a Famous Book," an account of Dr. Benjamin Franklin's autobiography; "School Histories and Some Errors in Them," "Epitaphs from the Old Burying Ground in Groton," "Early Records of Groton, 1662-1678," "History of Medicine in Massachusetts," "Groton During the Indian Wars," "Groton During the Witchcraft Times," "Boundary Lines of Old Groton," "The Geography of Groton," prepared for the use of the Appalachian Mountain Club; "Groton Historical Series," three volumes; "An Account of the Physicians and Dentists of Groton," also "An Account of the Lawyers of Groton," "The Career of Benjamin Franklin," a paper read before the American Philosophical Society, Philadelphia, May 25, 1893, on the 150th anniversary of its foundation; and "An Address Before the Old Residents' Historical Association of Lowell," also an account of the library of the Massachusetts Historical Society, "An Historical Sketch of Groton, 1655-1890," and a "List of the Early American Imprints" in the library of that society.

The funeral services for Dr Green were conducted in the Old South Church. Reverend George A. Gordon, D.D., pastor of the Old South Church, conducted the services. Many prominent men and representatives of many of the societies to which Dr. Green belonged during his long career of usefulness attended the services. He was buried in his native town, Groton, where burial services were held in the First Parish Church.

Dr. Green's life was characterized by diversity of endeavor and fulness of achievement. His tastes were simple. For many years he resided on Harrison avenue, where he won the deserved love and confidence of his foreign neighbors and friends. "No better illustration of the character of the man can be cited than the case of the apple woman who used to have her stand at the old United States Court House at the corner of Temple Place and Tremont street. She had been ordered from her stand at the building, and at whatever place she established herself she could not carry the trade she had had. To Dr. Green she told her story.

To secure her old stand Dr. Green got the endorsement of Assistant United States Treasurer Kennard, United States District Attorney Sanger and the United States Marshal Banks. The petition was forwarded to the Secretary of the Treasury at Washington, with a personal letter from Dr. Green. The woman was allowed to return to her old stand."

An editorial appreciation of Dr. Green in the *Transcript* says:

"Dr. Samuel A. Green was of the most admirable type of the real Bostonian—solid in his attainments, conscientious and public spirited in the performance of every public duty and in the maintenance of the civic interest, polished in education, affectionate in his thought toward his native town and the city of his residence—the 'conscript father' in the old and best sense."

Miscellany.

IN MEMORIAM.

WILLIAM HENRY BUFFUM, A.B., M.D.

Lieutenant, Senior Grade, U.S.N.

Aesculapian Club, Chapter 1902.

WILLIAM HENRY BUFFUM was born in Providence, R. I., June 25, 1877. He attended Brown University, graduating with the class of 1898. He was a member of the class of 1902 in the Harvard Medical School, from which he graduated with honors. He was one of the charter members of the Aesculapian Club in the Chapter of 1902. After a medical house officership at the Massachusetts General Hospital on the service of Drs. Shattuck and Cutler, he returned to Providence to begin the practice of internal medicine. Later he became much interested in obstetrics and still later in pediatrics. He was a member of the State and National societies and at the Rhode Island Hospital he was chief of the new ward for diseases of infants.

He was also associate visiting physician to the Providence Lying-in Hospital. With the formation of Base Hospital No. 5 of the United States Navy, the members of which were in large part from the staff of the Rhode Island Hospital, he volunteered for service, receiving the rank of Lieutenant, Senior Grade.

Soon after the arrival of this unit overseas, Buffum contracted influenza, which was followed by pneumonia. He died in Liverpool on the 13th of October, 1918.

Earnest, quiet, hard-working, unassuming, each of Buffum's many friends will for long years treasure closely the memory of his sterling character and gain high profit from the splendid example set by his all too short life. We mourn the loss of a good and kindly friend; a genial companion; a loyal son of his two Alma Maters; a true disciple of Aesculapius. For such as he there could be only one answer to the call of his country; and those of us who were so fortunate as to see him shortly before his unit sailed for England, know his pride and thankfulness in the fact that he was able to serve.

"Only those are fit to live who do not fear to die; and none are fit to die who have shrunk from the joy of life and the duty of life.

* * * * * * * * *

These are the torch bearers, these are they who have dared the Great Adventure."

HARRISON BRIGGS WEBSTER, A.B., M.D.

Major, Medical Corps U. S. Army, A.E.F.

Aesculapian Club, Chapter 1909.

MAJOR HARRISON BRIGGS WEBSTER, M.D., was killed in action in France October 7, 1918. He leaves a wife and three children.

Dr. Webster was born in Boston, January 26, 1884. He graduated from Noble and Greenough School, entering Harvard in the class of 1905. He was prominent in rowing, as well as in all class activities, being a Class Day officer. After graduating from college, he entered the Harvard Medical School, receiving his diploma *cum laude* in 1909. He then became surgical house officer at the Massachusetts General Hospital. After finishing his interneship, he went to assist Dr. Grenfell, in Labrador. Returning in two years, he settled in Castine, Me., where he practised until war was declared.

One of the first to enlist, he started at the bottom and rapidly rose in rank, as his sterling qualities were recognized, until at the time of his death, he was Major, acting as regimental surgeon of the 47th infantry. Judging from his letters, he was in the thick of the fighting in several engagements, and all who knew him, knew that he was taking no heed for his own safety when help was needed.

"Buntie" was a lovable and jovial companion at all times. In all his work he combined unusual surgical skill and fine judgment.

According to the meagre accounts obtainable, he was killed by a shell while helping extricate an ambulance loaded with wounded, which was caught in a mud hole. He died doing heroic work for others, as he would have wished to die. Those of us who knew "Buntie" will mourn a true friend and a brave comrade.

Correspondence.

CARLYLE'S DESCRIPTION OF INFLUENZA IN 1837.

31 Massachusetts Ave., Boston, Mass.
December 8, 1918.

Mr. Editor:—

The following description of the influenza epidemic in London is from a letter written by Carlyle to his younger sister, Mrs. Hanning, who lived in Manchester.

The letter was written in January, 1837.

"All people have got a thing they call Influenza, a dirty, feverish kind of cold; very miserable, and so general as was hardly ever seen. Printing offices, Manufactories, Tailor shops, and such like are struck silent, every second man lying *sniftering* in his respective place of abode. The same seems to be the rule in the North, too.

"I suppose the miserable temperate of climate may be the cause. Worse weather never fell from the Lift, to my judgment, than we have here. Reek, mist, cold, wet; the day before yesterday there was one of our completest London fogs,—a thing of which I suppose, you even at Manchester can form no kind of notion."

Very truly yours,
WM. PEARCE COUES, M.D.

SOCIETY NOTICE.

THE NORFOLK DISTRICT MEDICAL SOCIETY.—A regular meeting of the Society will be held in the Roxbury Masonic Temple, 171 Warren St., December 31, at 8.00 p.m.

Communications: The Conservation of Industrial Man-Power Through the Standardized Methods of the Life Extension Institute, Martin Edwards, M.D.; The Care of the Workers of the Thomas G. Plant Company, Marion H. Lewis, M.D.; Value of an Industrial First Aid Department, Matthew Porofsky; What Industrial Work Means to Me, Louise Monroe; A Few Words Regarding the Emergency Work of the Industrial Plants of Ward Twenty-four, Charles F. Stack, M.D.

BRADFORD KENT, M.D., *Secretary.*

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MEDICINE.

COMMUNICABLE DISEASES IN THE NATIONAL GUARD AND NATIONAL ARMY OF THE UNITED STATES DURING THE SIX MONTHS FROM SEPTEMBER 29, 1917, TO MARCH 29, 1918.

VAUGHAN, V. C., AND BEMER, G. T. (*Jour. of Lab. and Clin. Med.*, August, 1918). This article, occupying 81 pages or the entire space of this month's edition of this journal, is an extremely interesting and valuable one. It is richly illustrated by tables and charts showing morbidity and mortality in a very graphic way. Cases of epidemic are frankly discussed, such as those due to inadequate clothing, hospital or medical care, etc. Each disease is analyzed separately and also in groups. This article is very comprehensive and gives an excellent survey of diseased conditions in army camps. [E. H. R.]

TREATMENT OF LEPROSY WITH SODIUM GYNECARDATE.

MUIR (*Ind. Med. Gazette*, June, 1918) reports results in the treatment of thirty lepers with sodium gynecardate "A". A 3% solution of the gynecardate in distilled water with 1% pure carbolic acid and 1% sodium citrate was prepared, and of this solution from 0.5 c.c. to 5.0 c.c. were given three times a week intravenously. The injections were stopped or the dose reduced if untoward symptoms developed—febrile or inflammatory reaction, diarrhea, headache, dizziness. Improvement was recorded by outlining the anesthetic areas with a caustic or with the prick of a pin at weekly intervals. The circumscribed areas yielded much more rapidly to treatment than the more diffuse patches. Improvement in the tubercular nodules was indicated by softening of the lumps, to be detected only by the sense of touch. With one exception, the improvement in this respect was marked. The most rapid progress was recorded in the youngest patients and in those who had been ill the shortest time. One patient, however, who had been ill eighteen years, lost all traces of anesthesia and nodular swelling. Leper asylums, the writer concludes, should not be places where lepers are kept till they die but hospitals from which year by year patients would be turned out cured. [L. D. C.]

RAT DESTRUCTION AS A MEANS FOR THE PREVENTION OF PLAGUE.

DENNYS (*Ind. Med. Gazette*, May, 1918) gives elaborate statistics to prove his contention that the destruction of rats is useless as a measure for the prevention of plague. It will not save a town if other conditions are favorable for an epidemic. In several of the outbreaks investigated he finds evidence that the attempt to reduce the normal rat population tended to increase the chance of a town's becoming infected. Towns previously plague-infected, where no rat destruction was attempted, were apparently not more prone to recrudescence than those in which vigorous and systematic rat campaigns were conducted. The writer believes that money spent on rat destruction is money wasted. What is needed is

(Continued on page vi.)

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(*Continued from page iv.*)

a method of controling or checking the multiplication of the rat flea or of reducing the number each rat is able to harbor. [L. D. C.]

QUININE PROPHYLAXIS IN MALARIA.

ROGERS (*Ind. Med. Gazette*, July, 1918) writes an interesting paper on the prophylaxis of malaria in India. In places where the great majority of the inhabitants are already infected, he says, quinine prophylaxis is of little use except in immigrants, among whom it is of the utmost importance. For the general population, full curative treatment once in three months is necessary to materially reduce the disease. For successful prophylaxis the dose should be not less than 10 grains—enough to kill all the invading parasites. The intervals between doses should not exceed two days less than the mean incubation period of the most rapidly developing form of malaria present, which will almost invariably be the malignant tertian variety with a mean incubation period of six days and a minimum of two days. This interval should therefore, be not less than four days and, if an epidemic is present this should be reduced to two days. The prophylactic doses should be given on two consecutive days, in order to act on the stage most amenable to quinine of each brood of a double infection. [L. D. C.]

SURGERY.

THE TRAUMATIC ABDOMEN.
ACUTE PANCREATITIS.

DEAVER, J. B. (*Annals of Surg.*, September, 1918). These two articles by this author are concise and readable and full of the meat of the author's wide experience. They are worth reading. [E. H. R.]

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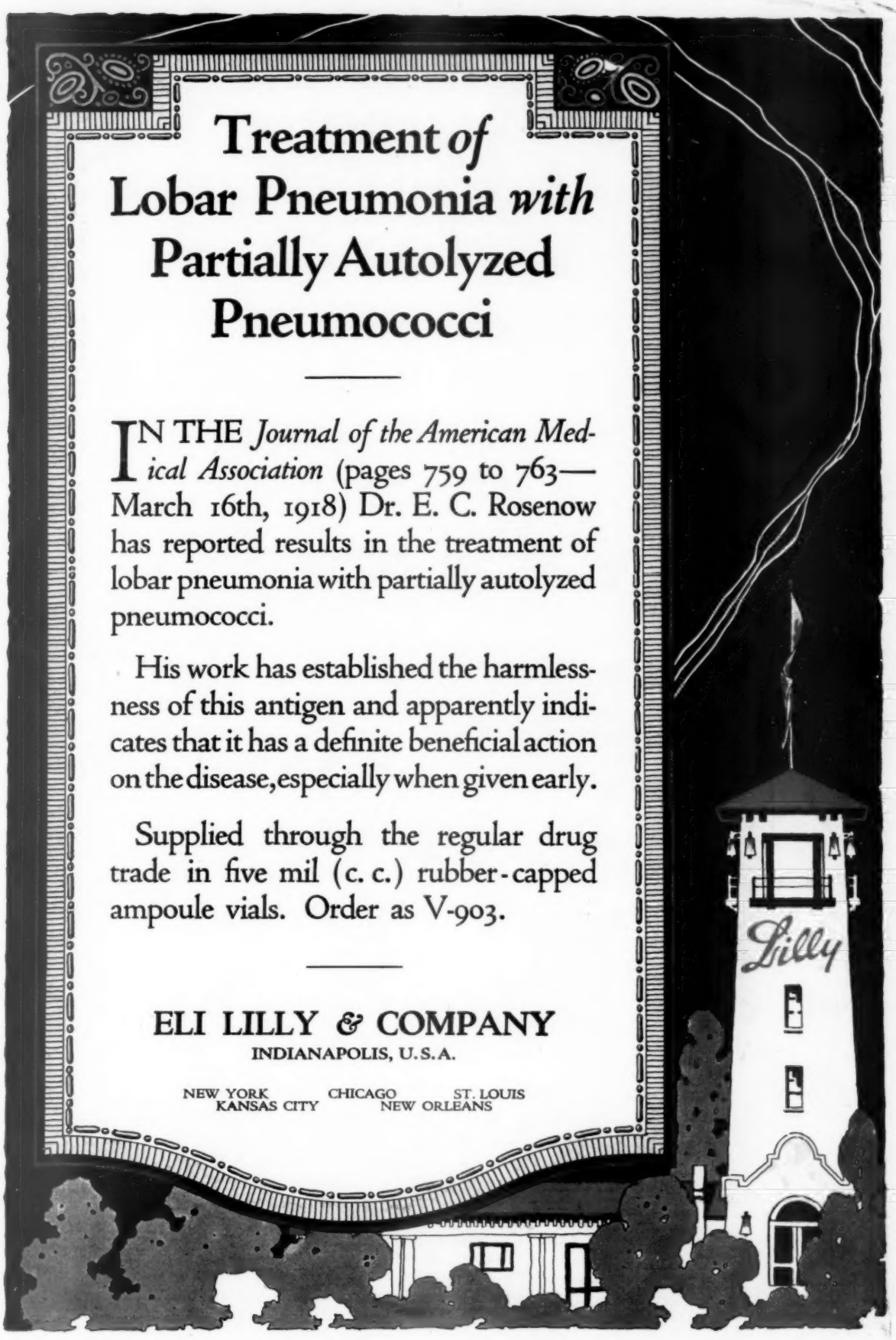

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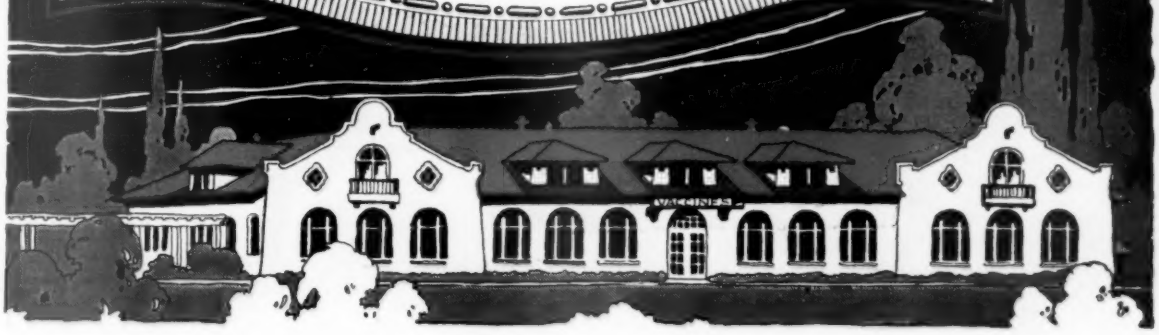

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Influenza, Bronchitis and Pneumonia

are sure to continue to be more or less prevalent during the coming months. Thus, for a long time, lapses in hygiene or personal prophylaxis will mean the possibility of these diseases developing in the susceptible. Influenza does not need to be raging as it has been, to be a constant source of danger to those predisposed by age or circumstance. In 1916, even when it was not epidemic, Influenza caused over 18,500 deaths!

The importance, therefore, of maintaining an effectual line of defense against bacterial infection cannot be exaggerated. With the chief salient in our hygienic "front" so evidently the nose, mouth and throat, it is clear that these parts must be effectively guarded.

Fortunately, this is not difficult, for in DIOXOGEN, medical men have a dependable means of defense that is especially qualified to keep the upper air passages free from infectious organisms.

Pure, non-irritating, non-toxic, tasteless, colorless, and yet more potent in germ-killing power than the usually employed carbolic or bichloride solutions, DIOXOGEN has proven itself the safest and most serviceable germicide for all hygienic purposes.

The place DIOXOGEN fills in countless homes, and its wide-spread use by physicians in combating infection is due to professional recognition of the safety and efficiency of this non-toxic germicide.

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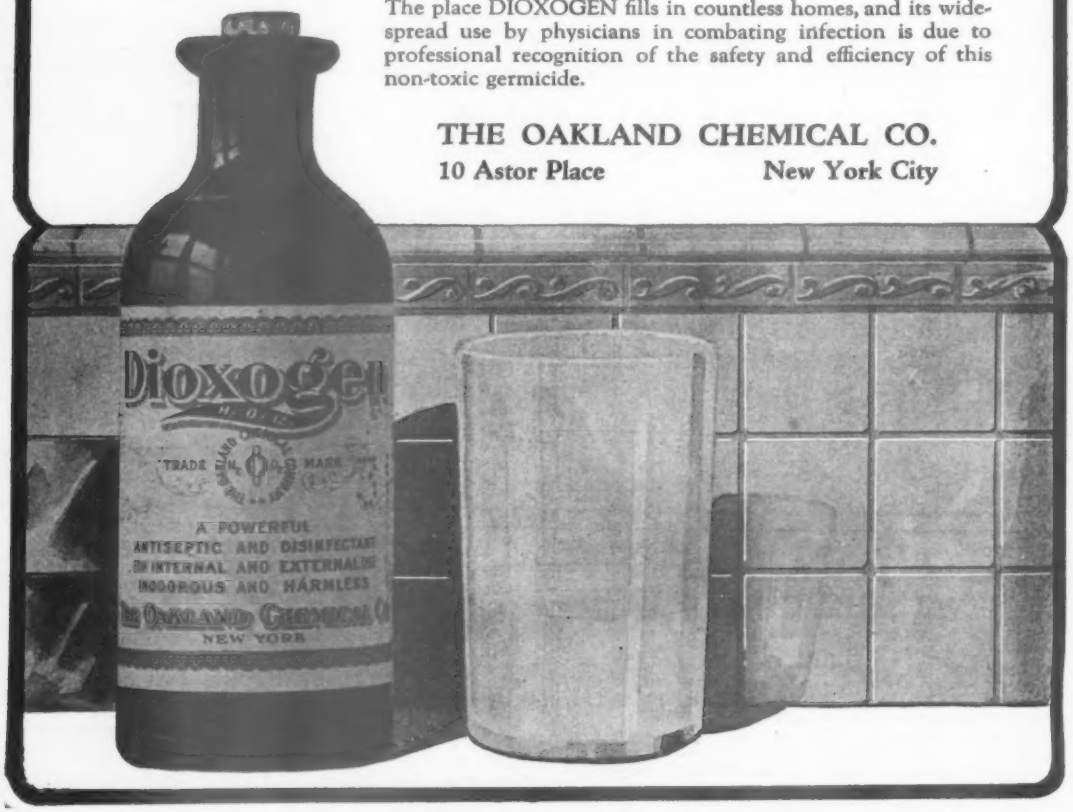

One of San Francisco's Best Known Physicians Said

"I have used between 700 and 800 doses of The Cutter Laboratory's Mixed-Vaccine-Respiratory-Infections as a prophylactic against Influenza and in not one instance has there been a failure completely to protect the individuals so immunized."

This statement was made at the height of San Francisco's epidemic of Spanish Influenza, and is convincing enough to satisfy even the most conservative as to the value of Mixed Vaccine prophylaxis in this class of infections.

Theoretically, a Mixed Vaccine which protects against Influenza and (even temporarily) against Pneumonia and the other complications following Influenza, is better than one which protects only against Influenza. Practically, this seems to have been proved by the experience of many physicians in widely separated areas, and our faith in Mixed Vaccine Respiratory Infections,—"M. V. R. I.",—as a prophylactic has been more than justified by the splendid protective results following its use.

Just how permanent is this immunity has yet to be established, but if it is for no longer than 2 or 3 months it is still a remarkable stride in preventive therapy.

As a preventive of recurring "colds" which make life miserable for so many every winter, it has been found by many physicians that in most instances three prophylactic doses administered 3 or 4 days apart in the fall, followed by two more doses at 3 or 4 day intervals, three months later, are sufficient to carry such individuals through the trying winter months in good health.

Of course resistance can be broken down by unusual stress of exposure, lack of sleep, fatigue and bad habits generally. But even in such cases there is usually a remarkable showing of increased immunity as compared with the almost entire lack of resistance in former winters.

Should there be at any time a recurrence of the old disposition to "catch cold," administration of one or two doses of the vaccine is usually sufficient to dispel it.

Ask your Druggist for "Cutter's" Mixed Vaccine Respiratory Infections.

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